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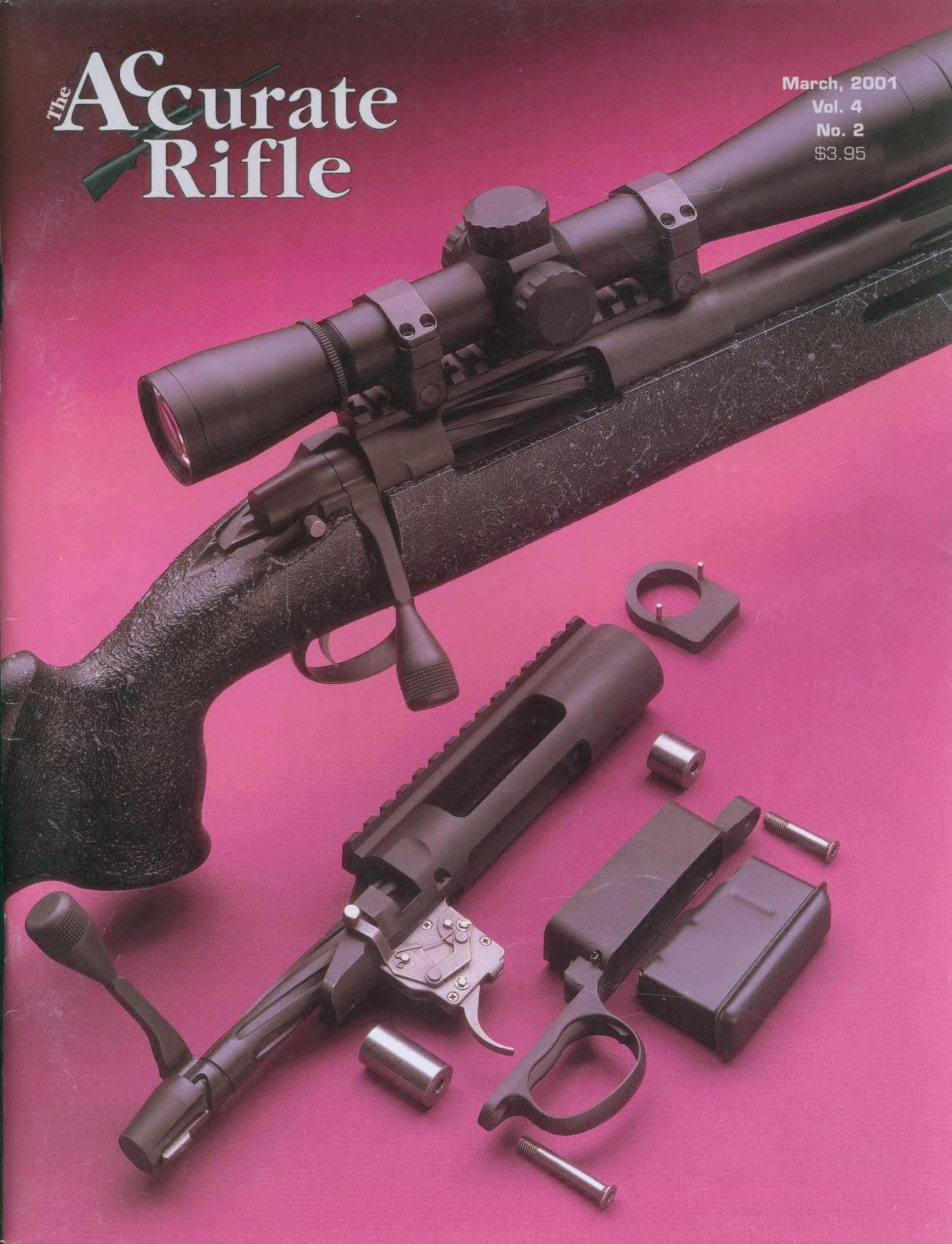

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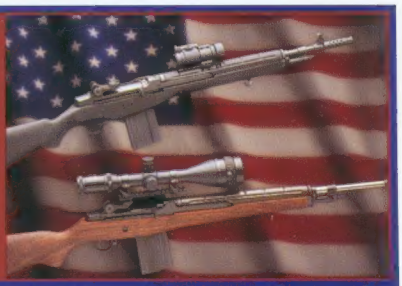

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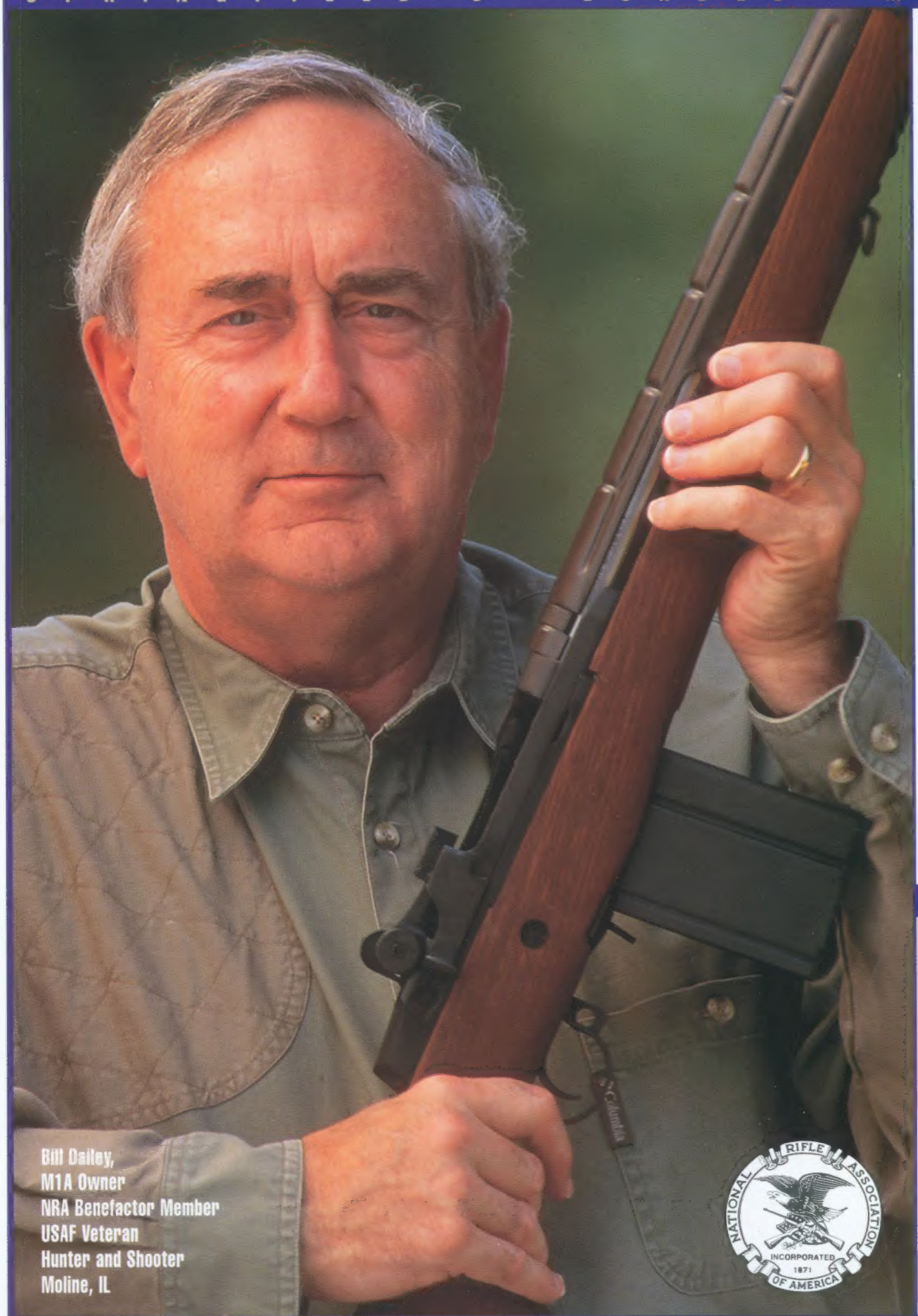

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Editorial

We know of no spectacle so ridiculous as the British public in one of its periodical fits of morality.

Thomas Babington Macauley (1800-1859)
Collected Essays (1843)

The delivery of your monthly magazine is a bit less than an exact science, as is re-proven to us every thirty days or so. *The Accurate Rifle* is mailed on the 10th of each month, and *Precision Shooting* is mailed on the 25th of each month. Just to use the latter publication (**PS**) by way of illustration…many of our southern subscribers find themselves receiving their copies sometime between the 10th and 15th of the following month. New **PS** subscribers frequently begin to wax wroth (You can look it up if you're so minded; it means that they were becoming very PO'ed) somewhere around the 5th of the following month, demanding that we drop whatever it is that we're doing just then, and immediately mail them another copy. It is not our practice to replace errant copies of either magazine for approximately 30 days. A few of you good souls have taken up the discussion of the singular atrocity that is your **PS-TAR** monthly delivery date with your mail carrier, who invariably is as familiar with national mail distribution details as you are with the philosophy of Spinoza. Typical commentary from such worthies is invariably along the line of "Nonsense; it should be 5 days or less!" (But only on days when the sun rises in the West). While brooding on this recently, a report on "Delivery Times" (for publications mail) appeared in *Postal World* recently (November 13th, to be exact). We'll spare you the nitpicking; let's just go to the very last line of the report. "Standard A Mail (publications) can take anywhere from about 3 days (mail destined for originating entry ZIPs) to 20 plus days for delivery". They said it; not me.

Web sites. We do have a web site for both publications; it's shown in the right hand column of page 5 of every issue of each magazine. For **PS** it's www.precisionshooting.com And for **TAR** it's www.theaccuraterifle.com Each of them are upgraded monthly, and there are three months "in archives" for each magazine. We have the cover of the issue, the selected article of the month, copies of current book ads, and subscription information.

Merrill Martin writes on the world of moly

Dear Dave,

Congratulations! You have an alert writer in Dave Scott (author of "Comes The Dawn" in our January issue).

Yes, I was hit by the lube contamination in Moly plating also. Believe it or not, I came up with the same solution, but did not carry it to such a lengthy process as did Mr. Ferrell.

I simply put a tablespoon of the dishwashing, degreasing stuff (Not Dawn….but close), into a pint of hot water and into my tumbler with a batch of bullets and tumbled for about 5 minutes. Then I tumbled them for another 5 minutes in clear hot water, and dumped them in a strainer and dried them over a hot blow drier, shaking the strainer to get all the water out. That's all. From there, the bullets went into a shaker or tumbler for moly plating.

I've had to re-moly dozens of boxes of plated bullets because the moly hadn't stuck. Simple test-wet your fingers and try to rub off the moly—most did! I was trapped like most shooters by assuming that if it looked good, it was. Over the years, the oil or lube on the new bullets had contaminated my steel balls and tumblers. It's a devil of a job to remove—lots of tumbling of the balls while cleaning the inside of the tumbler with the detergent.

Retumbling the suspected contaminated moly coated bullets is quite an experience—some comes completely off the bullets in 5 minutes of dishwasher solution. I don't use it straight, but dilute it and dump each wash. Others that have been plated properly come out black and shiny. These we replate for half-time to build it back up a little.

One thing that I must mention…Those bullets that are properly plated can be fired into a recovery or an expansion media or game, and the bullets can be upset (mushroomed) and the moly is still there. Any that came off was not properly plated on.

Maybe this explains the spate of successful tests when we were just beginning; nothing was contaminated yet.

Boy, did I get bit by this one! I was working on my new plating method and new material, the WS2, and getting spotty results until I also found the plating was not sticking. Many months of research to find this lube contamination all through my moly tumbler system.

The moly doesn't come off the bullet and foul the barrel if done right. Tell Dave Scott you're supposed to dilute the

Continued on page 5

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Editorial

Continued from page 3

Dawn, not use it full-strength on anything, even your fingers! Full-strength, I could see it ruining a bore if left overnight therein!
Merrill Martin

A hurry of hoofs in a village street,
A shape in the moonlight, a bulk in the dark,
And beneath, from the pebbles, in passing, a spark
Struck out from a steed flying fearless and fleet:
That was all! And yet, through the gloom and the light,
The fate of a nation was riding that night.

Henry Wadsworth Longfellow
(1807-1882)
The Ride of Paul Revere

About the Cover

It is of course a Nesika Bay action, of the type that Jacob Gottfredson is writing about so very well in his three part series in these hallowed pages (Part II is in this very issue). Photography is by Turk Takano, of Dallas, Texas. The good Mr. Takano has been, for years, one of the best-known photographers for the Japanese firearms publications. It is Turk's first cover appearance with us; hopefully it will not be his last.

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TABLE OF CONTENTS

March, 2001

Editorial 3

Nesika Bay Precision — Part 2:
Nesika's Tactical Rifles *by Jacob Gottfredson* 7

60 Years A Chuck Hunter *by Bob Bell* 15

The Forgotten Race For The High Velocity Crown
by Bob Jourdan 22

Wandering The Vapor Trail *by Ed Pocock III* 27

Custom Stocking A Farquharson — Part Two & Three
Fitting The Machined Stock *by Dominick Pisano* 32

The 5.6 x 61 Vom Hofe Super Express
by J.C. Munnell 38

The Blue Coyote
A Tale From My Cowboy Days *by Jack Rush* 46

Secrets For Loading The Old Ones — Part 2
by John Campbell 48

Bipods — A Sniper's Curse
An Opinion Piece *by Norm & Rocky Chandler* 53

A Wildcat Swift, The Ultimate "Golden Age" Varmint Rifle
Jerry Swinney's Second Memo For The Rifled Arms
Historical Association 55

Roger Bacon, Bobby, And Me *by Hap Rocketto* 59

Powder Position Always Matters:
A Lesson That I Keep Relearning
by M.L. McPherson 64

Bore Sighting & The Stoney Point Laser Magic
by Norman E. Johnson 66

What's Clean
by Irv Benzion 72

Weatherby's Varmint Rifle:
The Mark V Super VarmintMaster
by Roy L. Towers, Jr., 2000 78

BY JACOB GOTTFREDSON

Synopsis: This is the second in a three part series dealing with Nesika Bay Precision's tactical rifles. Part I took an in-depth look at their various actions, and in particular those that Nesika has chosen to fill tactical roles from .308 to .338 caliber. Nesika Bay Precision is the manufacturer of one of the highest quality, precision made actions in the world, having gotten its start in the most demanding and prestigious of pure accuracy endeavors: Benchrest. Having then branched out into 1000 Yard Benchrest and other forms of competition, as well as varminting, and hunting, Nesika is taking on the tough task of building actions and rifles for tactical needs. This series of articles is offered in three parts, beginning with the evolution of their tactical actions, the performance level of their production rifles, and concluding with my own spec built tactical match rifle. This article explores Nesika's production rifles and evaluates their performance level.

I met Glen Harrison and Mike Allen for the first time in Phoenix, Arizona at the Cactus Classic Benchrest match in early March of 1999. At the end of the two day competition, Mike helped me load two of their tactical rifles into the back of my Durango for the long journey home.

These first paragraphs, which start Part II, are being written October 28, 2000. Thus I have held possession of their rifles for eight long months. I am sure they are about to pull their teeth, or drive to South Texas, whack me over the head, and reestablish possession. However, I have had the opportunity to study and shoot the rifles extensively during the better part of this past year. They are my idea of what the term "Ultimate Rifle" means. I hope to show you why in this article.

The Ultimate Rifle

Having said that I consider Nesika's tactical rifles to be an "Ultimate Rifle" begs definition, so I guess I ought to start there. Like many of us, I am, for the most part, a hobbiest rifleman. I compete in traditional 100/200 benchrest, 1000 yard benchrest, and tactical matches. I am a hunter as well. Though not enamored with curios and antiques, I love specialty rifles. That is to say, the modern day caricatures of what rifles were first invented to do: provide and protect. I get excited about Cyborg, the 125 pound rifle Skip Talbot shoots in 1000 yard matches; or those contorted examples they call free rifles; or the traditional 100 pound benchrest rail gun that returns to battery after each shot and makes looking back through the scope for each successive shot unnecessary. But I would not use any of them to provide and protect. Particularly when I was forced to carry such a thing through the mud, or on my back for miles, or shoot from any of a dozen, immediate, and very uncomfortable positions.

Thus, to be brief, my idea of the "Ultimate Rifle" is one that can be made to shoot like a competitive rifle, but which can be carried on one's back anywhere, go through anything, and keep on performing at a very high level. It must be able to **endure hardship and harsh environmental conditions.** It must be heavy enough to be **stable** but **light enough to carry.** It must be mechanically **reliable** (no batteries please). It should be **subdued** in color. Last, but not least, it should be superbly **accurate** from ranges of less than 100 yards to 1000 yards and more. It is the simple but efficient tool of the hunter or tactical shooter ... those back to basics endeavors of providing and protecting. And it is the type of firearm that peaks my interest most. The Nesika Bay Tactical Rifles fit the definition of "Ultimate Rifle".

The Nesika Bay Precision action is the heart of their tactical rifle. Part I of this series covered Nesika's high quality actions. They are examples of some of the best the world has to offer in modern day bolt actions. EDM and CNC technology are used to produce exacting tolerances from quality materials. The

Nesika Bay Precision Part 2 *Continued*

standard configuration incorporates TiAN coating that provides a very tough, corrosion resistant surface that will take considerable abuse.

Starting with their basic actions, Nesika Bay has created tactical rifles that will be covered and evaluated in this article.

The Nesika Tactical Rifles

To quote Nesika Bay,

"The reason Nesika Bay Precision started building Tactical rifles is that we believe that a higher quality, more accurate rifle can be built using an action developed for extreme accuracy and manufactured using state-of-the-art CNC and EDM technology than using a hunting action that needs to be reworked and trued. Although hunting actions have been used for tactical applications for many years, we believe that it is time to develop the ultimate tactical rifle founded on modern technology where reliability is a requirement. Our actions are stiffer, have better mechanical properties, and are proven in the field where extreme accuracy is also a requirement. There is no method, style, technology, component, configuration or caliber that we can't do and do better than anyone else."

Nesika is currently producing two configurations of tactical rifles.

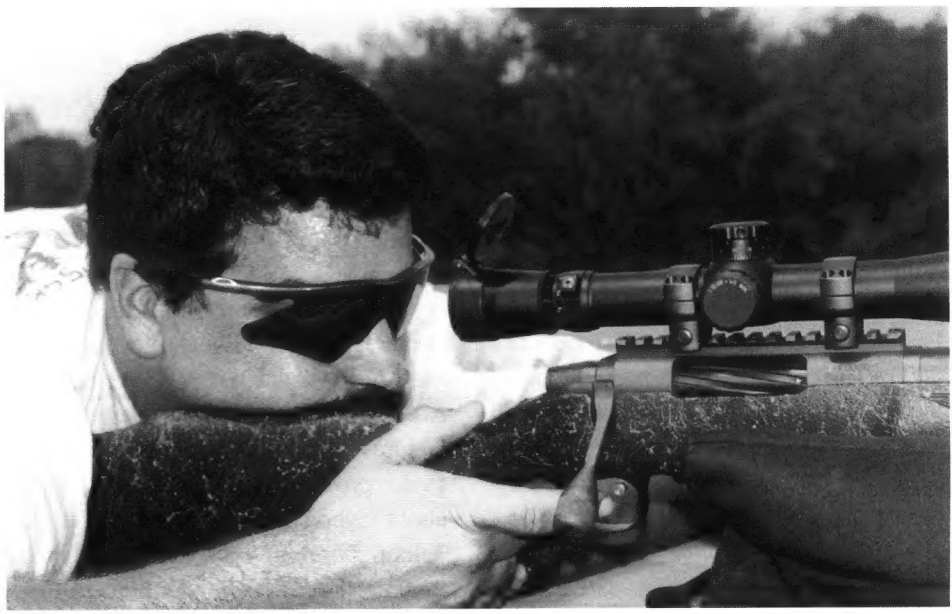
1. The "Urban Tactical" rifle incorporates a 1.350" receiver and short barrel for quick handling. It uses a MIL-STD-1913 mount (two steel press fit pins and six 8x40 steel screws), stainless "BDL" bottom metal or detachable box, and adjustable trigger. It weighs approximately 10 pounds and comes in either .243 or .308 Winchester.
2. The "Heavy Tactical" rifle is the same as the "Urban Tactical" except for a 1.470" diameter action, heavier vertical grip stock, and 24" inch barrel in .308 Winchester, 26" barrel in 300 Winchester magnum, and 29" barrel in .338 Lapua. A 20 minute sloped MIL-STD-1913 mount is included. The heavy tactical can also be chambered in the Patriot and Warbird cartridges from Lazzeroni.

The rifles can be ordered either coated or uncoated with a peened, non-reflective surface. The dark coating on my samples is TiAN: Titanium Aluminum Nitride. This coating is extremely hard (approximately 92 HRC) and improves corrosion resistance. And since black or very dark colors shed heat faster than light colors, this coating will serve that purpose as well. Speaking of cooling, the rifles were amply floated with enough clearance to promote cooling via air flow as well. The dark coating is also non-reflective and meets my criteria of "subdued" very well.

The rifles that I received have fluted Hart barrels. I am not certain whether Nesika intends to promote that in future rifles or not. While Nesika can do just about anything you might desire, I found that the flutes pick up dirt and mud in tactical situations, and I, for one, would do without.

Both the receivers on my rifles are Model K's chambered in .308 Winchester. The light is 1.350" diameter, and the heavy model is 1.470" diameter. Nesika stated that they will use their Model L for the .300 Winchester magnum, again in either diameter, and the Model M will be used for the Lapua and Warbird. Lazzeroni's Patriot will be built around the Model S.

Let me step aside from the subject at hand for a moment and explain in a bit more detail a statement I made above. Benchrest competitors, to include 1000 yard benchrest competitors, often use a single shot action for its additional stiffness. In traditional 100/200 yard benchrest they also do so because they shoot sighters throughout the group, making a magazine impractical. During the past few years, many right hand shooters have taken to ordering the loading port on the opposite side. That is, a right hand shooter might leave the bolt on the traditional side for a right hander, but have the loading port on the left side. This facilitates speed somewhat and puts the port where it can be seen. When the bolt is pulled to the rear, the shooter extracts the case with a finger, throws a new cartridge on the loading ramp, and runs it home with the bolt. It is quite surprising how fast some competitors can manage to shoot a five round group this way. Some can manage it smoothly and without stress in less than 20 seconds. The reason benchresters do this comes from the desire to shoot all 5 rounds in the same condition, beating it,



Thomas Blahnik of Sniper's Paradise tries the Nesika Bay Urban Tactical rifle. Note the safety forward of Thomas' finger. The safety is installed in the usual position on the Heavy Tactical rifle. The Jewell trigger safety can be ordered either way.

so to speak, before the condition changes. Of late, manufacturers of custom actions have been building actions with a mini-port on the right side as well and including a weak ejector spring. This speeds up the activity a bit more, relieving the competitor from having to flip the spent case out with a finger. Thus, as the bolt is being pulled to the rear, the competitor is reaching immediately for a new case and placing it in the loading port on the left side of the receiver. The spent case, meantime, is rolling out of the receiver through the mini-port on the right side and onto a towel placed on the bench below the rifle. I have watched Mike Radigan complete his 5 round groups in under 12 seconds using this method, placing all five shots in the same hole at 200 yards. Something to think about when you shoot your next twenty-second, five-dot exercise. In any case, I have brought this up to illustrate that Nesika can manufacture any such scenario you might be interested in. They don't know it yet, but I'm going to have Nesika build me one just like that described above. I just have to beat Mike's speed no matter the size of the hole in the paper!

Note the length of the bolt handle on the Nesika Heavy Tactical rifle. The rifle was shot off the Hart front rest a great deal, but a Harris bipod was used also.

Trina Anthony with the Heavy and Thomas Blahnik with the Urban Tactical rifles from Nesika Bay Precision.

Both of my rifles were fitted with Jewell Triggers and had superb, crisp let-offs. The Jewell trigger never failed. Both rifles were also fitted with McMillan fiberglass stocks. The heavy rifle included a rail in the forearm for bipod attachment or any other typical forearm enhancement the shooter might want.

The Hart match grade barrels were first rate examples of Hart's work. The first most pleasant thing about the barrels, and the rifles overall, of course, was that they were superbly accurate ... which I will get to later. The second most pleasant feature about both rifle's barrels was that they did not foul. This proved true also of the Nesika Spec Rifle, the subject of Part III of this series.

As I sit here writing this, I have the 14 pound rifle propped up in front of me on the table between the keyboard and the monitor. The forearm is squarish and flat on the bottom. Three slots have been installed in the side of the forearm to promote barrel cooling. This is something that may not be included in future rifles as they tend to attract mud and dirt in harsh conditions.

I mounted a 6.5-20x50mm Leupold Long Range Tactical scope with side focus, mil dot reticle, and 30mm main tube. The rings are Leupold's Mark 4 rings mounted to the MIL-STD-1913 base.

The stock has an almost vertical pistol grip and palm-finger swell with a slight swale for the thumb. The comb is straight and an adjustable butt plate was included. Swivel connects for a sling are included front and rear. The exterior is a mottled black color with fine, splatterings of gray throughout.

The light rifle is similar in color, but has a much smaller, traditional mountain style stock that is checkered at the forearm and grip. The light weighs approximately 10 pounds, and the heavy approximately 14 pounds.

The stock has been pillar and glass bedded. The floor plate is steel, providing

Continued on next page

Nesika Bay Precision
Part 2 *Continued*

the strength necessary to torque to 65 pounds ... according to many, including Chandler, Remington, and the FBI, the extra torque is conducive to accuracy.

Although I am not adverse to muzzle brakes, they have their place. One of them is not on a light tactical rifle, which I consider both of these to be. You can do without the barrel extension when carrying; trash, dirt, and mud clog up the holes; and during rain or snow conditions, they leave too much area exposed for a drop of moisture to be introduced into the bore. A raindrop in the barrel will send the bullet in very odd directions. Of course, one can cover them with electrical tape, and the first shot will go to the same impact point as when zeroed, but the noise generated is still a problem to others around you. The flash produced has a much greater area of exposure as well. The .308 is a small enough cartridge to handle in these rifles without such aggravations anyway (my opinion). These Nesika rifles did not incorporate muzzle brakes.

True to their Nesika heritage, the actions sported the long bolt handle and tear-drop, knurled end piece.

Performance

Working the actions on these rifles felt identical. To satisfy military criteria, firing springs in the 28 pound range have been included. This tends to make the actions a bit stiff over their predecessors. The "Borden Bumps" have to be polished so that after the TiAN coating is applied, the bolt assumes the original dimension and moves effortlessly and smoothly, and does not tighten up too much when cocking and camming a spent shell out of the chamber.

Both rifles included double-stacked, four-round, boxed magazines. This was a point of contention with me when I was shooting matches. Most courses of fire are either 5 or 10 rounds. Four rounds make loading more awkward than it needs to be. Nesika is working to change this, but the manufacturer has not yet complied. While these rifles are not necessarily meant for match shooting, the larger magazines in the 14 pounder would not hurt anything. It would somewhat off set the purpose of the light rifle, however ... but each to his own.

The rifles (as I used them) were the simple tools they ought to be. There are no cheek pieces that need adjusting and that are subject to failure, no fancy, adjustable butt pieces that gather trash or must be held open in a positive way by placing a foreign object or empty case in

This photo shows the safety in the usual position on Nesika's Heavy Tactical rifle. Also note the slots in the forearm to facilitate cooling of the barrel. The fluted bolt can be seen as well. Dirt is rotated out of the receiver with this configuration.

The MIL-STD-1913 mount can be seen in this photo with the Leupold Mark 4 rings in place. You might remark that the scope is not positioned as well as it could be. Although I agree, I never changed it while shooting several hundred rounds of ammunition.

the opening. Anyone can grab the rifle and feel relatively comfortable enough to make the shot.

The actions are super strong and continued to feed positively without failure. After a great many rounds, I saw no notable degradation of the bolt face, lugs, or the barrels. Barrel life, at least, is one very positive feature of the .308 Winchester cartridge.

I fed several varieties of ammo through these rifles.

Federal 168 grain Gold Metal Match
Federal 175 grain Gold Metal Match
Lapua 167 grain Scenar
Lapua 170 grain Lock Base
Winchester Supreme Competition 168 grain Nosler HPBT Match
Samson 168 grain HPBT Sierra MatchKing
Hawk's View Custom Ammo with 168 grain Sierra MatchKing
Remington 168 grain Match
Several varieties of reloads using 168 and 175 Sierra MatchKing bullets

The majority of these loads shot very well. Some mild reloads were poor. But others of the ammo listed shot consistently in the .2" and .3" range. I produced a few groups in the very low .2's and some in the .1's. The Federal 168 grain Gold Metal Match, Winchester Supreme, and the Hawk's View Custom Ammo produced outstanding results. This Hawk's View stuff, by the way, is great, and I will be doing an article about it soon. Mark provided 3 lots, each with progressively more powder. They all shot well, but one of them shot better than the other 2 in all 3 rifles.

I did not baby the rifles while shooting. I shot them cold and very, very hot. Like a well built rifle should be, it did not matter. I shot several rounds without cleaning. That did not seem to matter either. Cold, clean barrel shots went right where they should. I also had the opportunity to shoot them in both cold and hot weather. All shooting was done near the coast, however, with elevations running only 60 to 100 feet.

To test accuracy, I followed approximately the same procedure throughout. I would show up at the range before daylight and be ready by first light. This gave me about 2 hours each morning of near perfect conditions. I had chronographed the ammo early on, and so did not have to worry about that any longer. I would run 5 shot strings at one hundred and then at various distances to 600 yards. I drove to a friends range one day to sight the rifle in at 1000 yards. This, however, was only done to find the clicks required to get to the longer ranges for an upcoming match. What surprised me was that the Hawk's View 168 ammo hammered the 12" x 12" steel target at 1000 yards.

The rifles were shot using a typical benchrest competition technique. Wind flags were placed and mirage boards tacked next to the targets. On occasion a barrel mirage shield was used as well. The rifles were supported by a Hart front rest and Bald Eagle rear. Shots were taken only in identical, very mild winds. Once the wind became fast or switchy enough that it was possible for an errant shot to be due to wind, the session was stopped.

Once I was confident in the "pure", no wind, accuracy of the rifles, I switched the Hart rest out for a Harris bipod, but

Continued on next page

The short barreled Urban Tactical with high Harris bipod and Nightforce NXS 5.5-15x50mm scope.

A close up of the Urban Tactical rifle with the NSX 5.5-15x50mm scope.

Nesika Bay Precision
Part 2 *Continued*

remained on the bench. The third set was taken from the prone position using the Harris bipod in front and the Bald Eagle rear. I proceeded to fire approximately 300 rounds out of each rifle this way. These were fired in any condition that presented itself to test the stability of the rifles. One learns, shooting benchrest competition, that a rifle/barrel combination that will shoot in no wind conditions will not always do so well in the wind. Bullets from barrels that delay stability because they have not quite gone to sleep might shoot great in a no wind condition but are upset by wind pressure against a yaw condition of the bullet in the first few yards out of the muzzle. This was not a problem in the Nesika rifles with the better ammo that I tested.

My wanting to complete this evaluation prevented me from practicing any other reasonable sniper courses. By the time the sniper match came around, I was out of ammo. Jacob Bynum quickly loaded 500 rounds for me for the match, but as it turned out, the milder load did not perform like some of the better ammo. Even so, the ammo Jacob produced was good enough to win.

I returned the light rifle and entered the sniper match with the 14 pounder. I did not do well. The Nesika rifle was ready to win, but the driver wasn't. Moving and speed targets were out of my grasp as was standing off-hand, and a couple of other matches for that matter. However, when it came to the pure accuracy events, I let the rifle do its work and the outcome was to our liking (mine and the rifle's).

While it is true that practice is more important than a superbly accurate weapon, such a rifle in the hands of a great shooter cannot be beat. And since I am not a great shooter, I began to divine how I could increase my chances by certain changes to the basic rifle … the very catalyst for so many strange and contorted competition rifles these days. It was this underhanded scheming that led to the Nesika Spec Rifle that is the subject of the next article.

Conclusion

I have evaluated several sniper rifles during the past 3 years. All of them have been quite different in concept and configuration. None of them, however, was based on a true custom action, and they were certainly not in the same quality class as a Nesika action or rifle.

The concept of a true custom action as the basis for a sniper rifle will raise some amount of controversy. Is the extra cost value added? Is the kind of accuracy available from a rifle built around benchrest techniques counter productive? Does an action of such quality really improve accuracy enough (or at all) to warrant the additional cost?

It has been my experience that snipers are less than 50% exact through a well thought out, diverse, and difficult course. It has also been my experience that part of this is attributable to equipment, not that it fails, but that its accuracy round after round after round could be better. Snipers are usually content with accuracy between 1/2 and 1 minute … largely because they have to be. I submit that their buyers are not being discriminating enough. Pure accuracy of 1 minute does not translate to 1 minute in the field, but more often double that. However, if a rifle can produce .3 minute accuracy, one might extrapolate .6 minutes in the field. The speed courses are a different animal altogether where I'm not sure that fine accuracy is nearly as important as a great deal of practice and a smooth, fast action and a stable rifle.

Skeptics make the argument that the quality of the action, for example, is not requisite to accuracy. Their reasoning is that some of the barrels they mount shoot very well while others do not. Thus the barrel, they argue, is the critical factor. And, indeed, the barrel is extremely critical to the production of fine and consistent accuracy. On the other hand, barrels are dependent on the action, and in the long run, a much greater percentage of rifles will produce high quality results using high quality actions and proven benchrest techniques in manufacture. To be sure, if the action ceases to function, it doesn't matter what barrel you have mounted.

High quality is indeed expensive. I often wonder if military buyers are not concerned with this as much as they are not highly impassioned about snipers. This may or may not be due to two factors: First, many have never been in a sniper's shoes, and second, government decisions are far too often politically motivated.

All I can say is: if my butt were on the line, give me a Nesika rifle any time.

An offside view of the Nesika's Urban Tactical rifle.

Ok, so you noticed that I included two knives in the last picture of Nesika's Heavy Tactical Rifle. Well, I did so for a couple of reasons, both of which might not make either the editor or Nesika happy. First, this magazine is entitled, *The Accurate Rifle*, not *Blade*; and second, Nesika will brain me for changing the subject for a moment. But I got to get it in … urges, you understand.

During my sojourn as a "Green Beret", I was introduced to the saying that a special forces trooper was distinguished from all others by his taste in certain areas. For example, it was imperative to own a Rolex watch, a Randall knife, and a Ruby ring. I somehow ended up with a cheap digital watch. The only knife I ever carried in South East Asia was a Swiss Army knife with several blades and tools in it … and I had to pay for it. While it was one of the most useful tools I carried, it was a far cry from a Randall knife. I did manage to secure a rare, star ruby for my wife, but it was a bit on the feminine side for me.

Years later I bought a book written by a "Green Beret" officer. One section was devoted to the knives of special forces. Several of them were "Government Issue" to special forces. Issued to whom? I never saw anyone with anything remotely resembling such Rambo pig stickers and hootch builders as were pictured there.

I have been a knife lover forever. Collecting them is a costly proposition however. Still, they seem part and parcel of the tactical/hunter's gear. Most of my hunting entails a lot of walking. What would I leave behind to lighten my load? Well it wouldn't be my rifle, my ammo, or my knife. Since time immemorial, the knife has been one of the most useful tools invented by man, and probably one of the first.

When Cold Steel offered to let me evaluate several models that seemed to reasonably resemble those that a hunter or tactical shooter might covet, I jumped at the chance. Not only that, but I picked a couple models that looked a lot like what I had seen in the book previously mentioned.

The models you see complementing Nesika's Heavy Tactical rifle are called the SRK (Survival Rescue Knife) on the left and the R1 Military Classic on the right. The SRK incorporates Carbon V steel (Carbon V is a high carbon, low alloy steel) with a black epoxy powder coating on the blade. The SRK sports a 6" long by 3/8" thick blade with clip point that is extremely strong. The coating controls rust and minimizes light reflection. Touted as a combat knife, it is razor sharp, uses a single quillion finger guard and a deeply checkered, rubber like grip, and weighs 8.2 ounces.

The R1 Military Classic is much like those purported to have been issued to special forces. It is made of AUS Stainless. Stainless quality is achieved by adding more chromium and reducing the carbon content. The problem is that as a steel becomes more stainless, it becomes much harder to sharpen. Cold Steel uses AUS 8A stainless, a high carbon, low chromium steel that hits a compromise between sharpening ability and resistance to corrosion. The blade is 7" long and weighs 9.25 ounces. The handle is made of Kraton. The R1 comes with a brown leather sheath and includes a Norton fine India stone. "The R1 is an exact replica of the original that has seen action around the globe including Korea, Vietnam, Central America, and the Persian Gulf."

Yeah, they say that, but where is mine? Jealousy aside, these are very well made knives that can take a lot of punishment and provide a lot of use. The leather sheath on the R1 is well made, rich looking, and attractive.

It broke my heart to have to return the Nesika Tactical rifles and the Cold Steel knives. A Nesika rifle, a Cold Steel knife, and a South Texan just seem to go together.

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6112 NE Minder Road
Poulsbo, WA 98370
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FAX: 360-297-3973

Cold Steel, Inc.
3036-A Seaborg Avenue
Ventura, CA 93003
800-255-4716

Although I would never win a photo contest, I love this shot.

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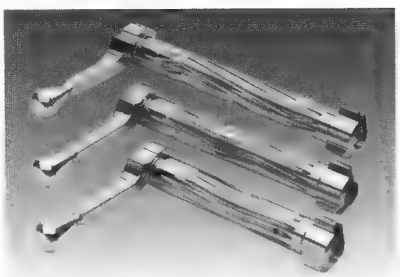

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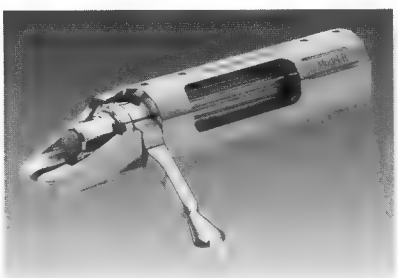

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60 Years A Chuck Hunter

BY BOB BELL

"It could be worse," Bob Wise said. "We could be home putting up window screens or you could be painting your porch ceiling."

"Or even cutting grass. The ultimate uselessness."

"Not for your neighbor, right? You tell me that's what he does for recreation."

"Yeah. Most every evening. Has three mowers. Last summer I told him for five bucks a week he could cut mine. I figured anyone who enjoys it so much would be glad to have another acre to play with. Sorta like getting another gun."

"He didn't take you up on it?"

"Didn't even smile."

"Some guys got no sense of humor."

Wise and I were sprawled under a wild cherry tree in a scraggly fencerow overlooking a just-cut hayfield, rifles propped on their rests, bolts open but ammo handy. He was searching the thick stuff that had grown up along an abandoned railroad right-of-way on the far side, but I was taking a break from the glassing.

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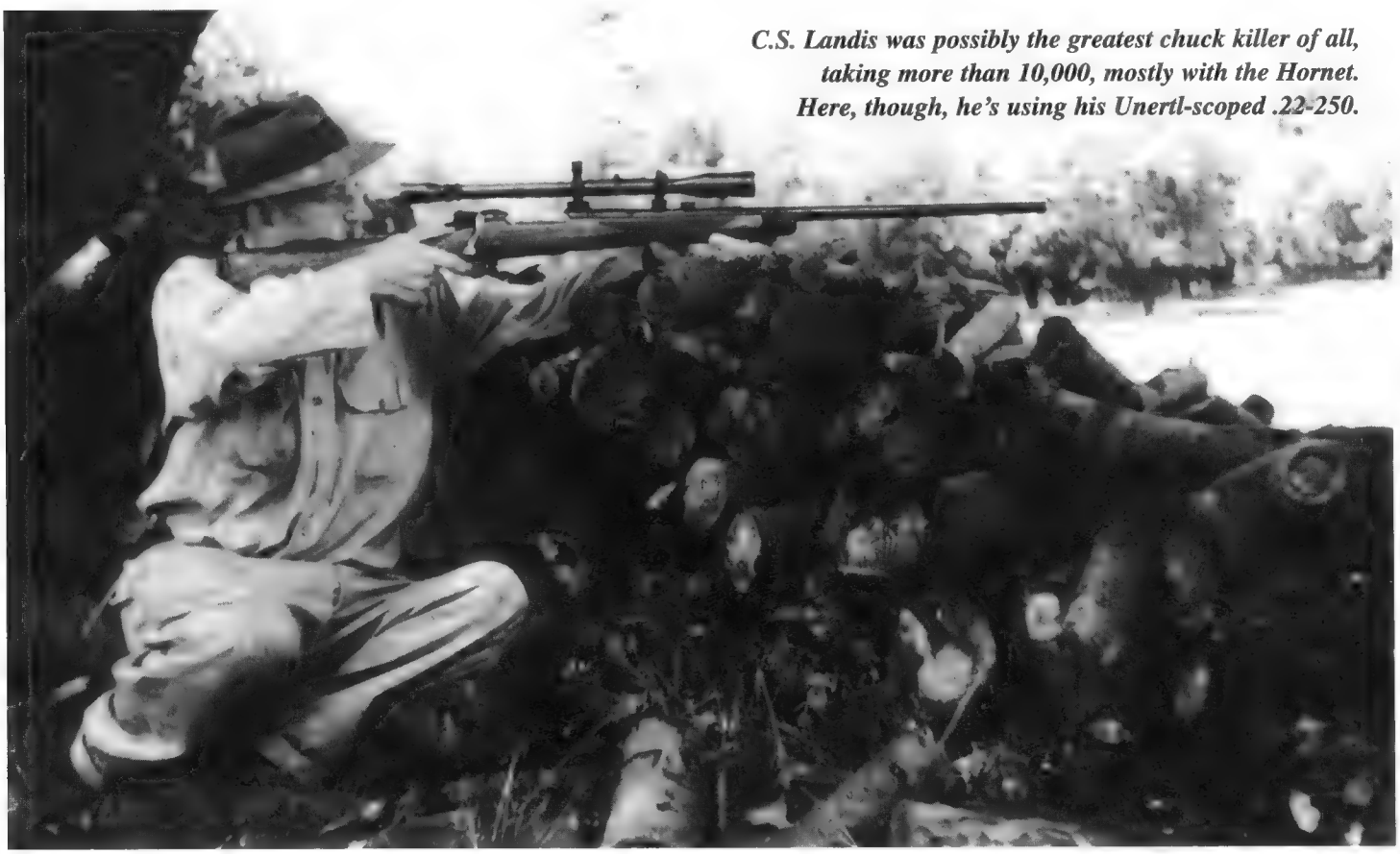

C.S. Landis was possibly the greatest chuck killer of all, taking more than 10,000, mostly with the Hornet. Here, though, he's using his Unertl-scoped .22-250.

60 Years A Chuck Hunter

Continued

"Things sure are slow," I said after awhile.

"You're the one always saying chuck hunters spend an hour using binoculars for every shot they take."

"That's how I figger it. After sixty summers of shooting them."

"Sixty years! Lor Dalmighty, that's over half a century, fella."

"Well, I shot my first one in the summer of '37 and I been shootin' them ever since, but I gotta knock off for my army time in WWII, so that leaves about sixty."

"That's a long time. You're even older than I am."

"I'm older'n anyone. Except TR."

"Ted Them, your deer-huntin' buddy?"

"Yeah. He insists he's younger'n me, but I don't believe it. TR wears glasses even when he's not readin' and has fallen arches."

"That proves your point all right. He's gotta be older."

Bob lowered his binoculars and sprawled back in the shade, so I picked up my 10x50 aus Jena's and took over the glassing. Somebody's gotta do it.

"What do you remember best," he asked. "After all those years, all the shots?"

I pondered awhile. "It's a tossup between the guys and the guns. Dad was the biggest influence, of course. He's been gone more than thirty years now, but he's still with me on every hunt. And Andy was always around, from just after the war until he died a few years ago."

"Hufnagle?"

"Yeah, my oldest shooting pal, next to Dad. Huf and I hunted together forever — here, Idaho, Wyoming, Colorado, New Mexico, Canada... And Wardrop. Al and I met just after the war, too, shooting on opposing rifle teams. He must've built me a dozen rifles since.

"Then there were the Hock brothers, Earl and Paul and George. Earl got banged up in a car accident and Paul lost half a leg in Italy — stepped on a mine — but they still hunted with me in a lot of tough country in the Rockies. We killed a lot of stuff together, not just chucks and crows. And there was Mike Kocher and Carl Hoover and Dan Shaffer. And Ted Parker and Del Edwards. Del had the prettiest .222 I ever saw. A 722- Remington — got it right after they came out — restocked in a beautiful crotch walnut. Used to shoot 'em in the ear, one after the other, like clockwork. 'What do you need those big guns for?' he used to kid us. "A .222'll do it all." Maybe he was right. One winter he wanted us all to go up to Sullivan County and bushwhack overnight with just the stuff we wore in deer season, to see if we could do it. Wish now we had. Del's been gone a long time now. Hoover used to shoot chucks with a .270. Liked to get 'em on a flat rock and bounce 'em into the air... .

"We used to have chuck feeds in the fall, at a cabin up along Big Fishing Creek. We'd head-shoot a bunch of young ones in early summer, clean and freeze 'em for a few months. The wives would fry 'em in a batter, and we'd eat them with homemade french fries and beer until we couldn't hold any more. Better than chicken any day, the young ones.

"That was decades ago, the late '40s to the mid '50s. Terry and I moved away then, one place or another from Jersey to California and back, but I still think of those days once in awhile. Since then most of my shooting has been with guys like you and TR, and of course ol' Don Lewis who has maybe killed more

An evening's results with the .240 Cobra, a long-gone but excellent wildcat on the Swift case. Bell's had a M70 action, Buhmiller barrel, 10x Bushnell.

Bell took this chuck with a M700 .223 at about 240 yards — a typical shot in east-central Pennsylvania.

When it's pickup time in the evening, sometimes you come back with double handfuls.

chucks than anyone else I know."

"Do you remember your first chuck rifle?"

"Sure. Who ever forgets his first? I was eleven years old and had worked all summer to get a 94 Winchester so I could go deer hunting. I wanted that little carbine so bad I could taste it. A .32 Special. But deer season wouldn't be in for months and I was crazy to shoot something. Somebody said I should go for groundhogs — that's what they called them then — and I did. Sat behind a hole early one morning and waited 'till one stuck his head out and blew him away. At about six feet."

"That's a good range for one of those carbines."

"Hah." I wiped sweat out of my eyes, raised the glasses again. "That was the first, last and only chuck I ever shot that way. After a couple seconds of excitement, I knew there had to be more to hunting than assassination. By the next summer I had a little Weaver 29-S scope on the Model 72 Winchester, and that made it a 50-yard outfit with Long Rifle hollow points… if I hit 'em just in front of the ear. Didn't work so good on chest shots, though, so I wanted something bigger."

"What'd you get?"

"Nothin' right then. World War II came along not too long after, and it wasn't "till that was over and I came home that I got my first good chuck rifle. Ackley put a .257 barrel on a 98 Mauser action for me, Bump Lynn stocked it airtight in a dense walnut blank — he was a patternmaker by trade, and nobody ever inletted tighter — and I mounted a 6x Zeiss Zielsechs I'd liberated in Germany. Ol' T. K. Lee, himself, put a small dot in it for me, and Dad and I killed piles of chucks and crows with it. Still remember seeing him pop a crow at 387 long steps — the longest shot I'd ever seen at that time.

"Weirdest shot I ever made on a chuck was with that .257. I was using a 60-gr. Speer loaded hotter than the hinges of hell. That's how we did things back then; didn't have much sense. So hot sometimes there'd be just a puff of dirty smoke in the air out there when centrifugal force blew that thin-jacketed bullet apart. But when it hit a chuck or crow, it was like a hand grenade going off. Instant fragmentation. Then one day I tried a head shot at a feeding chuck a couple of hundred yards off. He went up in the air and came down on his back, motionless. Just as I reached down to pick him up, he flipped to his feet, gave me a startled glance and dove into his hole. Turned out my bullet had hit right under his head and the concussion knocked him out. Another time with the same gun and load, the bullet hit a projection of red shale right in front of his head, blew it up, and a piece of the rock killed the chuck."

"How come I never saw that gun? Sounds like the kind you need — kills stuff without hitting it."

"Sold it to an elk outfitter in Idaho.

Continued on next page

Andy Hufnagle was Bell's shooting buddy for almost a half-century. Here he's using his Weaver-scoped .22-250.

Earl Hock's .22-250 was built on an '03 action, wore an externally adjustable Unertl Varmint scope, accounted for countless chucks.

Sometimes the terrain doesn't allow a solid shooting position, but here Mike Kocher tries a long shot anyhow. His gun? A Targetspot-scoped .22-250 Mauser.

60 Years A Chuck Hunter

Continued

Don't ask me why. Another gun I wish I had back."

"Should never sell any. But no one ever knows that in time."

"Right." I carefully focused the aus Jena's on a suspicious looking shadow near a hole 350 yards away, tried to transform it into a chuck's head, but couldn't.

"What'd you do then, without a varmint rifle?"

"Oh, I had one. Or two. I was into my Wasp period by then."

"You had a Wasp? The .219 Donaldson that everyone was writing about in the late '40s?"

"Three of 'em. All heavy barrels, all on 98 Mausers. The first had a Johnson Automatics barrel, the others a Pfeiffer and a Gregoire. Two of 'em were bullpups, which proves I still wasn't too bright about guns."

"How'd they work on chucks?"

"Great. The Johnson barrel was the least accurate, but I killed more stuff with it than with both of the others together, maybe because it was more portable. Had a 10x Edwards on it. Wish I had that back too. It was short, designed to mount on the action like of lot of today's scopes. External mounts, like the target jobs but friction adjustments, not clicks."

"Do you remember your load?"

"I was making my own bullets by then, in Banta dies. Couldn't afford RCBS, but the Bantas worked fine. Used a 50-gr. in the Wasps, mostly, with a heavy load of 4895. Surplus stuff from Hodgdon. He used to sell it in 150-lb. copper kegs — for thirty cents a pound. Nobody had chronographs then except the NRA and Phil Sharpe, so I never was certain of my velocity. If results were similar to those with today's 4895, I shoulda been getting about 3400."

"That must have done the job on chucks."

"Sure did. Plenty accurate for crows too, particularly from the Gregoire and Pfeiffer barrels. Once in a great while I'd get five shots in a quarter-inch, and half-inchers weren't uncommon. And with 12x and 18x Unertl target scopes, it was easy to sort a chuck's head out of the weeds at 250 or 300 yards, then plunk a bullet into it most anytime I had a decent rest. Like a draftsman putting pencil dot on a graph paper, as Charley Landis used to say,"

"The old chuck hunter from Wilmington?"

"That's the guy. He wrote a bunch of interesting books, including Woodchucks and Woodchuck Rifles. He once told me he'd killed over 10,000 chucks, most of 'em with a 54 Winchester Hornet that Jim Bashline owned later. I borrowed that rifle and shot it from the bench, but it didn't group for sour apples with any load I tried."

"Guess Charley had shot it out."

"Mebbe. But a Hornet barrel oughta last longer than that. Ben Connor put over 20,000 rounds through a Savage 23D Hornet, mostly on crows, back in the '30s and '40s. That was before I knew him, but he mentioned it different times. When we hunted with Earl and Paul, he was using a heavy M70 .243

Continued on page 20

Jim Bashline takes advantage of an available rest for his .222 Sako, with its early 6x Weaver.

Carl Hoover always got a special kick out of finding a chuck on a flat rock, bouncing it into the air with his .270.

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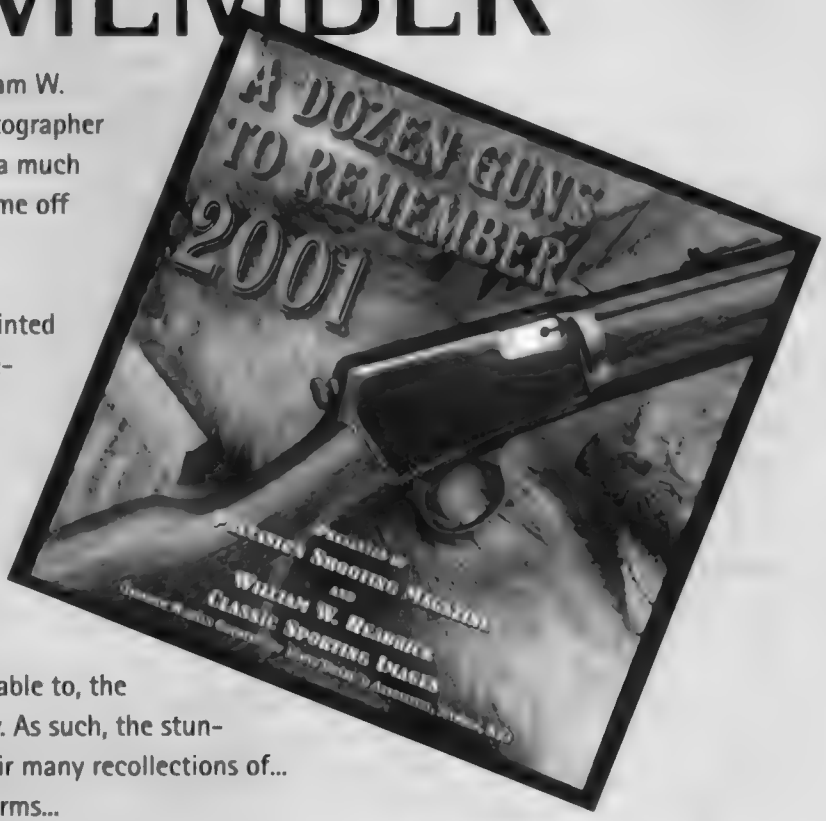

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June	Garand M1D Sniper rifle
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60 Years A Chuck Hunter

Continued from page 18

with a 15x Unertl Ultra Varmint. It was his third barrel on that action. He'd worn out a standard weight .270, then a heavy .270, and had a couple of thousand rounds through the .243 at the time. I never knew a better crow killer than Ben, with a rifle. I doubt if there ever was a better one."

"He got a .270 to shoot well enough for consistent kills on crows?"

"Sure did. Especially the heavy barrel. It had a 1:14 twist and he used light spitzers, heated up."

"How hot?"

"Too hot. Once we stopped at Sharpe's place, coming back from a hunt in Maryland. Somehow the load got mentioned, and Phil raised merry hell about it. But it did shoot. Many a time we spotted a crow swaying in the willows along the Susquehanna on a below-zero morning, 250 or 300 yards away, and Ben'd say, 'Watch me bust this one.' And then he'd do it. I'll tell you, hitting is one thing, and can be tough in itself, but to announce it in advance and then come through, well, that's like Babe Ruth pointing to the bleachers and then driving the ball there. And Ben did it time after time. After killing crows like that, chucks were easy."

"How about the Hocks, what did they use?"

"What everyone else was using in those days, the .22-250. Some still called it the Varminter back then, a great monicker for a chuck cartridge. I got my first one about 1950, a Pfeiffer barrel on a commercial double-set-trigger Mauser 98. Andy had a couple of them, too."

"He was using a .222 Mag when we went for prairie dogs in South Dakota, wasn't he?"

"Yeah. But it was like you and your .22-250. Only had a few hundred cases, so he hadda load them every night to have some to shoot the next day. That's why the .223 and military brass is the choice for there."

"That's obviously your pet dog caliber. How many do you have now?"

"I was up to seven until recently. Don't ask me why. They just sort of accumulated. But I'm down to three now… no, four, counting the Mini-14, but that's not legal for hunting here and not accurate enough for out there. I just keep it near my bed, with a full banana clip handy, just in case."

"I thought you still kept your .45 ACP close for things that go bump in the night."

"I do. Also the short-barreled Sweet 16. Never know what you might want. Remember what Charley Evans told me years ago — when you need a gun in a hurry…"

"The old Idaho gunsmith-Texas Ranger-US Marshal, whatever? I remember you talking bout him. He's dead now, isn't he?"

"Yeah, long time. A lot of my friends are gone. Andy, Mike, Del, Ben, Dick… But it's worth remembering that Charley died of old age. Nobody messed with that white-haired gunslinger."

"Nobody messed with Ol' Elmer, either."

"Nope."

"What was his favorite chuck rifle?"

"Remington's 7 Mag, I think."

"Figures. Probably with the 175-gr. Partition in it too."

Bob sat up and raised his 7x50 Bausch & Lomb's. Shadows were lengthening toward us but nothing else moved.

"Well, how about that early .22-250?

Paul Hock stepped on a land mine in WWII, lost most of a leg, but he didn't let that interfere with chuck hunting — in fact, hunted for big game with Bell in several Rocky Mountain states.

When Remington brought out the 40XB-BR I .222, Bell found it to be incredibly accurate in the field, often giving head shots at 300 yards. The Mike Walker-designed 20x scope helped a lot, of course.

How'd it work for you?"

"Fine, 'till it disintegrated."

"Oh my God. What happened?"

"Receiver ring let go. Pieces went all directions, barrel fell out, the Unertl looked like someone wrapped it around a utility pole, stock splintered…"

"Why?"

"That's what I asked Sharpe when I gave him the pieces. He showed me where the receiver ring had long been cracked on the inside for over half its thickness. It was a dull color, not fresh like the outer part. Apparently it had been cracked when it was case hardened during manufacture. It never was safe, but I'd fired it about 1500 rounds before it let go. Actually, shows how good the basic 98 Mauser design is."

"You still use the .22-250, though."

"Sure. I've had at least six or eight since then… you lose track after awhile. Know I used an 03 action after the Mauser. Was a little reluctant to fire the first shot with it — gun-shy, I guess — but I managed. Another Pfeiffer heavy barrel, shot like crazy. Think I killed more chucks with that one than any other rifle I've owned, except maybe the Cobra."

"I never saw a Cobra. How good was it?"

"Plenty. Fast and accurate. It was an early hotshot 6mm wildcat. Came out years before the .243 or .244. Forget who designed it, but it was a Swift case opened up to take a 6mm bullet and fireformed to sharp-shoulder straight-sided design. Wardrop fitted a heavy Buhmiller barrel to a Model 70 action for me — that was back when you didn't have to say it was a pre-'64 because there wasn't any other kind — and I made a varmint stock for it and used it for years. Never chronographed it, but it shot flatter than any .243 I ever used, so you know it was moving out. I used the 85-gr. Sierra hollow point mostly, because it was so deadly. Real destructive. One shot, Dad literally cut a small chuck in two with it, something I never saw happen before or since."

"That must have been about the time you were using the .222 Sako, too, wasn't it? The heavy barrel, maple-stocked one I've seen in the gun cabinet?"

"Yeah. Earl Hock made that stock. Glassed the barrel all the way and it's never moved since. The .222 seemed small compared to the Cobra, but it worked fine for routine shots — up to 250 or so — and several friends and I popped an awful lot of prairie dogs with it early on."

"You think there's any point in going even smaller than the .222 for chucks? Too much muzzle blast can be important these days, especially here in the East."

"Sure, the old Hornet and Bee will do the job at close range to 150 or 200, say, if a guy's fair on range estimation. Landis proved that over and over, and that's the kind of shots offered in a lot of farm country. And with just a head sticking out from behind a stump, a butt-of-the-ear shot can be just as interesting as a shoulder shot at 400 with a super-blaster. But some of those early Hornets — the Model 70, for instance — are collectors now. Might be easier to load a .222 or .223 down to Hornet velocity and sound level if noise is important. Then you can go to full power loads when you're in more open country."

"Well, after those sixty summers of chuck shooting, what would be your first choice overall" You must have reached some conclusion after all that time. I know you've used a lot of cartridges besides the ones you've mentioned here — the Improved. 257, the .25-06, the .224 Weatherby, whatever. If you could have only one, which would it be?"

"Putting me on the spot, huh? Actually, the choice is easy. It'd have to be the .22-250. Nothing else seems to handle all varmint-shooting needs so well. If you don't roll your own, factory ammo is extremely accurate. Or you can handload it to duplicate anything from the Hornet to almost the Swift. So it will handle all normal chuck shooting. Ol' Gebby was right when he called his necked-down .250-3000 the Varminter."

"I gotta agree with you," Bob said. "Which is why that's what I use most of the time." He looked out across the hayfield. "But not today. Almost quitting time and nothing's moving. Might as well wrap it up."

"Some days are like that." I started collecting my equipment. "At least it'll be too late to cut the grass when I get home"

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The Forgotten Race For The High Velocity Crown

The original record setting cartridges and consecutive holders of the velocity crown for factory big game cartridges, (L-R), .250-3000 Savage, .256 Newton and .270 Winchester. The first two resulted from work done by Charles Newton, and the third came from a Chinese caliber resurrected and produced by Winchester.

BY BOB JOURDAN

Prior to the development of smokeless powder in 1882, and its first use in rifle cartridges in about 1884, velocities had settled between 1000 and 1500 fps with various types of black powder. Most leading big game cartridges utilized lead bullets of 300 to 500 grains weight, fired from rifle bores of .40 to more than .50 caliber. The recoil was somewhat awesome, and accuracy from the average hunter's rifle left much to be desired. Toward the end of that century game numbers had been reduced and close range shots became fewer and farther between. The need for longer range rifles and cartridges became more evident and most experimenters knew that in order to obtain more range, higher velocities were needed. To load heavier with black powder meant increased recoil, and recoil was already more than most shooters could handle. Thus, the new smokeless powder became the saving grace for riflemen.

It was becoming evident to many shooters that the new smokeless powder was capable of moving velocities up considerably above those existing in all the black powder cartridges, and doing so without increasing recoil. The most advanced thinkers were even discussing the possibility of some day reaching the mythical speed of 3000 feet per second (fps), a velocity nearly double that of any of the prevalent black powder cartridges of the day. Reloaders were beginning to experiment with smokeless powder and were moving their varmint cartridge velocities well above the 1500 to 1800 fps they had been accustomed to with black powder. Many had discovered 2000 fps, and some had moved on to velocities above 2500 fps. Among big game hunters the new .30-30 cartridge, loaded with smokeless powder, was pushing a 170 gr. bullet at the lightning-like speed of 2000 fps from the new Winchester lever action Model 94 rifle. It was far and away the flattest shooting big game cartridge most hunters had ever seen, and it was rapidly replacing cartridges such as the .45-70 and .38-55, among many others.

By 1900 the recent wars around the globe had proved that repeating rifles of the new turnbolt design were handling smokeless powder cartridges with much higher pressures and velocities than the old Springfield single-shot .45-70s that were being phased out of our military. The new .30-40 Krag was the first U.S. military cartridge to use smokeless powder and be fired in a turnbolt, repeating rifle, but it gave way to a newer improved design, the Springfield Model 1903. This rifle used a new cartridge, the .30-03, later improved to the .30-06. Along with these changes came the first pointed, jacketed bullets, replacing the old standard lead, round nosed bullets that had been in use throughout history. Thus, the scene was being set for the forthcoming velocity race.

There were to be only three big game cartridges that came to be totally responsible for moving riflemen into our modern high velocity era we know today, the move that brought us into the 3000 fps realm. Two of them came into being through one particular individual, a cartridge wildcatter, and the third came from a factory in direct response to the private sector's success that became embarrassing to the old line company.

The general shooting public first became aware of a New York attorney named Charles Newton when he came on the scene in 1906 with published articles pertaining to his thoughts and experiments on improving most any and all phases of the shooting sport. He spent much of his time researching the subject of riflery, reading and studying every aspect of design and performance of everything from the old black powder era to the new smokeless powder days. His interest led to cartridge experimentation and he proceeded to develop several wildcat cartridges, generally in the varminting field, mostly of .22 caliber. He found his way into print by sending his comments to various publications regarding rifle and cartridge articles that had been published by others. His comments usually conflicted directly

with the commonly accepted views of current writers, including the revered E.C. Crossman who was writing for *Outdoor Life Magazine*. Within a couple of years he was being published monthly and his writing had been picked up by several major firearms publications. This brought his experimental cartridges to prominence, and shooters began chambering their rifles for his wildcat .22s. Newton preferred the use of rimmed cartridges and lever action rifles in his early days, and his first wildcat cartridges to gain any following were those leading up to his first commercial development, the rimmed .22 Savage Hi-Power. His cartridge predecessors to the Hi-Power included versions of the .25-25 and .28-30 Stevens, both necked down to .22 caliber, and Newton presented these wildcats to Savage Arms Company for commercial consideration. Since Savage had the Model 99 rifle already using the rimmed .25-35 Winchester case, Newton and Savage decided to neck that case down to .22 caliber, actually to .228, to produce the .22 Savage Hi-Power in 1912.

Almost immediately after Savage accepted Newton's .22 Hi-Power cartridge, he went to work on what he knew more shooters wanted, a high velocity, flat shooting, mild recoiling big game cartridge. His first work was with the 6mm Navy case necked up to .25 caliber, but he decided that case was in reality about dead, and it was dropped. Next, he tried the .30-40 Krag case necked down, but he thought more capacity would provide better ballistics. He moved to turnbolt rifles and the .405 Winchester necked to .25, and for the first time he was successful in obtaining a velocity in excess of 3100 fps with a 117 gr. bullet. It is noteworthy that Newton was still using rimmed cases for his experimenting, not confident that the rimless chamber could be easily and properly cut by most gunsmiths of the day. He again showed up at Savage asking that they change their Model 99 receiver to accept the large diameter .405 cartridge case necked to .25 caliber. Savage immediately recognized the advertising potential of the extremely high velocities Newton had obtained with the cartridge he called his .25 Special, but they refused to do the required redesign of their most successful lever action. In return, however, they wanted him to reduce his cartridge size to make it fit the internal rotary magazine of the M99 rifle. Several possibilities were discussed, including shortening the .30-06 and necking it to .25, but all would result in less case capacity and reduced velocity. Newton wanted the larger case that would propel his 117 gr. bullet at 3000 fps or more, and even

Continued on next page

The Savage M99 lever action rifle was the first rifle handling the first big game cartridge to reach 3000 fps, the .250-3000 Savage. Newton presented his .25 Special, designed on the old .405 Winchester case, to Savage and attempted to have them redesign the rifle to handle the large cartridge. It would not fit in the M99 rotary magazine.

The .256 Newton rifle and cartridge, both designed and manufactured by Charles Newton. Newton was dissatisfied with the changes made by Savage on his .25 Special, and went into manufacturing so as to further his cartridge ideas and beat out the Savage .250-3000 in the velocity race.

The Forgotten Race

Continued

though he did alert the Savage folks to the value of high velocities, he was sent away disappointed. But he did pursue the changes with the .30-06 case and in July of 1912 he submitted his idea of a shortened .30-06 case necked to .25 caliber, utilizing the 117 gr. bullet, that would fit the Model 99 Savage magazine. Savage moved ahead with the short .30-06 case properly tapered and necked for the .25, being much aware of the advantages of producing the first 3000 fps big game cartridge. They knew they could not reach 3000 fps with Newton's 117 gr. bullet, nor could they do so with the lighter 100 gr. job. They kept reducing the bullet weight until at 87 grs. they succeeded in reaching the desired 3000 fps velocity Only then did they announce the new .250-3000 Savage as the first commercial big game cartridge to achieve 3000 fps., capturing the big game factory cartridge velocity record. And even though Savage credited Newton with the cartridge, they had to finalize the design details without him, and against his desires!

Newton was not too happy with the events surrounding the new .250-3000 cartridge. He even stated in his writings concerning the .25 calibers that he had been "pounding the Savage people" to change their Model 99 rifle action, making it large enough to handle his cartridge designs. It had turned out that both of his .25 Special cartridges, one on the .405 case and later one on the .30-06 case, had been too large for the Savage action but both would handle the bullet weights he believed proper for best use on big game and both would produce velocities considerably above 3000 fps. Secretly, or not so secretly, he wanted his name on the highest velocity cartridges available. After all, it had been his work that led to Savage breaking the 3000 fps barrier....

After being somewhat rebuffed by Savage, Newton immediately contacted all the other rifle companies in an effort to get someone to build rifles for him, in his name, that would handle his .25 Special. His running conflicts with all the so-called big name gun writers of the day now came back to haunt him. The companies needed the publicity provided by those writers, and the writers, being constantly rebuffed by Newton, did not support anything Newton wanted to do. Thus, no company would cooperate by providing finished rifles for Newton. If he ever expected to be known for his development of high velocity cartridges, he had to have rifles to shoot them in. His deliverance came from overseas where bolt action rifles were being produced by none other than Paul Mauser.

The Mauser Company in Germany was more than happy to build rifles for Newton. All they needed was the firm order along with the type of rifle, caliber, etc. Newton obtained financial backing and began negotiating a contract. When the discussion of caliber came up, Mauser informed Newton there would be a one year delay to tool up for that odd caliber of .25. But if Newton was in a hurry, Mauser could change the caliber to .26, the European 6.5mm, and go into production immediately. Since this amounted to only .006" larger diameter of the bore, Newton signed the contract for the 6.5mm rifles. To make the cartridge fit the Mauser M98 action, both Mauser and Newton thought it should be a shortened form of the American .30-06 case. Newton made the changes, shortening the case to 2.44", and changing the shoulder slope from 17 degrees to 23 degrees, and Mauser went to work.

Back home, Newton immediately started writing about his new rifles that were being built by the great Mauser factory in Germany. He named the new cartridge the .256 Newton, and announced that it would far exceed the performance of the current velocity champion, the .250-3000 Savage. He then made deals with the old United States Cartridge Company to manufacture and distribute .256 Newton cartridges. The first loads were to be with 123 gr. bullets at a velocity of 3100 fps, giving Newton the new velocity record, this time with his name firmly stamped on each cartridge. The public, however, knew of Newton's work with the .25s and they looked upon the new .256 as being a .25 Newton High Power, even though it was a true 6.5mm, the bore measuring .256 rather than .250 as in the American .25s. This led many otherwise knowledgeable gun writers to also consider it a true .25, and even the great Phil Sharpe made that mistake in his evaluation of the .256 Newton, claiming

The .270 Winchester was brought out to overtake the .256 Newton in the velocity race in 1925. It originated as an old time Chinese cartridge, modified by Winchester to achieve a velocity of 3160 fps to become the new velocity king of the day.

(very correctly!) the bore was cut too large for .25 caliber bullets and therefore would give poor accuracy.

Newton's first order of Newton-Mauser rifles was for 24 rifles to be delivered in August, 1914, followed by 24 more the next month. The day after the first order arrived, World War I broke out...and no more Newton-Mauser rifles showed up.

The publicity Newton had been putting out resulted in a demand for his new .256 cartridges, regardless of who might produce the rifles. The demand was so great that Newton was forced to set up his own rifle and cartridge company, and in January, 1917 he went into production of the first American made, American designed, sporting rifle in a bolt action model. The rifles sold out in advance and orders began to stack up. Production soon reached 125 rifles per week, but before long the U.S. entered the war and Newton's cartridge manufacturing equipment was confiscated by the government, effectively shutting him down. In 1918 he was foreclosed on by the financiers. Newton went on to establish other rifle factories and produce other of his designs, but all failed as a result of Newton's inability to manage the manufacturing end of the rifle business. But the mold was cast, and Newton's name became synonymous with modern high velocity.

Meanwhile, back at the Winchester ranch they were still providing hunters with the relatively weak lever action rifles that could not handle velocities anywhere near those of the Savage M99 in .250-3000 caliber, and they certainly could not compete with the new bolt action .256 Newton. Many returning servicemen were demanding bolt actions since they had been trained with the Springfield M1903 rifles, and now desired cartridges that would perform better than those trapped in the old lever actions. Custom rifle shops had found a gold mine in barreling Springfield, Enfield and Mauser actions to handle the new modern cartridges, but Winchester continued to struggle with lever actions that were not as accurate and gave problems when chamber pressures were moved up. The simple fact was that Newton's work with high velocity cartridges and bolt action rifles had moved too far ahead of the folks at Winchester. Now they were being forced to try to design and produce their first sporting bolt action rifle. And while they were at it, they really wanted to show both Savage Arms Company and the upstart Newton Arms Company that Winchester could enter the high velocity race and succeed.

Winchester had war-time experience with bolt actions, turning out many rifles for the military. Thus, they were able to change those designs somewhat, selecting several features from each and combining them into a new sporting rifle. While this presented no insurmountable problems for the company, the selection of a cartridge that would give them the high velocity crown over that held by Mr. Newton was a formidable challenge. They had to design a new cartridge that would send off a bullet designed for use on big game and do so at a velocity above that of the .256 Newton's 3100 fps.

In general, they knew any cartridge case capable of producing velocities above 3100 fps with bullets heavy enough for use on big game would require a fairly large capacity. Since the .30-06 case was well known and easily available, they decided to use it with its full capacity. But of course they were surely not willing to simply copy Newton's .25 Special, and therefore decided to find a larger caliber. Their testing had already shown they could not achieve the needed velocity with .30 caliber big game bullets, and since Newton held the velocity record with a .26 caliber cartridge, they felt limited to something between the .26 and .30 that could be sent off faster. Thus, the search started. They really wanted their bullet to be different, so they researched all the exotic calibers in far away places. Before long they found one that would be different, and just might be made up with bullets heavy enough for use on big game, but light enough to provide velocities above those of the .256 Newton.

The selected, different, bullet had been around since before World War I, but almost unknown. The great Mauser factory in Germany had been offering their Model 98 rifles in various configurations to any country that would pay for them. One offering was the Model 1904 with sales aimed at police and guard organizations, as well as the military.

Continued on next page

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The Forgotten Race

Continued

Among those stepping forward for those rifles was China. They first ordered them in 7mm caliber and stamped as Model 1904/07. Later a second order was for a new strictly Chinese cartridge to be known as the Chinese 6.8mm, with the rifle marked as Model 1907. The bullet measured .277 diameter, and rifles were not only made by Mauser in Germany, but at least a few were manufactured in Austria by the Austrian Arms Company. Many of these Mausers were withheld from China when war became imminent in Germany, and those were then barreled with German 7.9mm barrels. But the 6.8mm, .277 bullet diameter, Chinese rifles vanished into China, generally unknown thereafter. No other country ever used that bullet for military purposes, before or since. When Winchester found that strange bullet, they had what they wanted.

The study of the Chinese 6.8mm cartridge showed that it was originally manufactured on a 7x57mm case necked down slightly from .284 to .277. Thus the capacity would be less than Winchester would have with their .30-06 case, and of course the Winchester velocities could be much higher. Either case configuration would function through the new bolt action rifle Winchester was developing. As for bullet weight, the Chinese used a 139 gr. bullet and Winchester knew they would have to experiment to find a weight that would allow them to obtain their goal of beating the 3100 fps of the .256 Newton. Their plans were rapidly coming together.

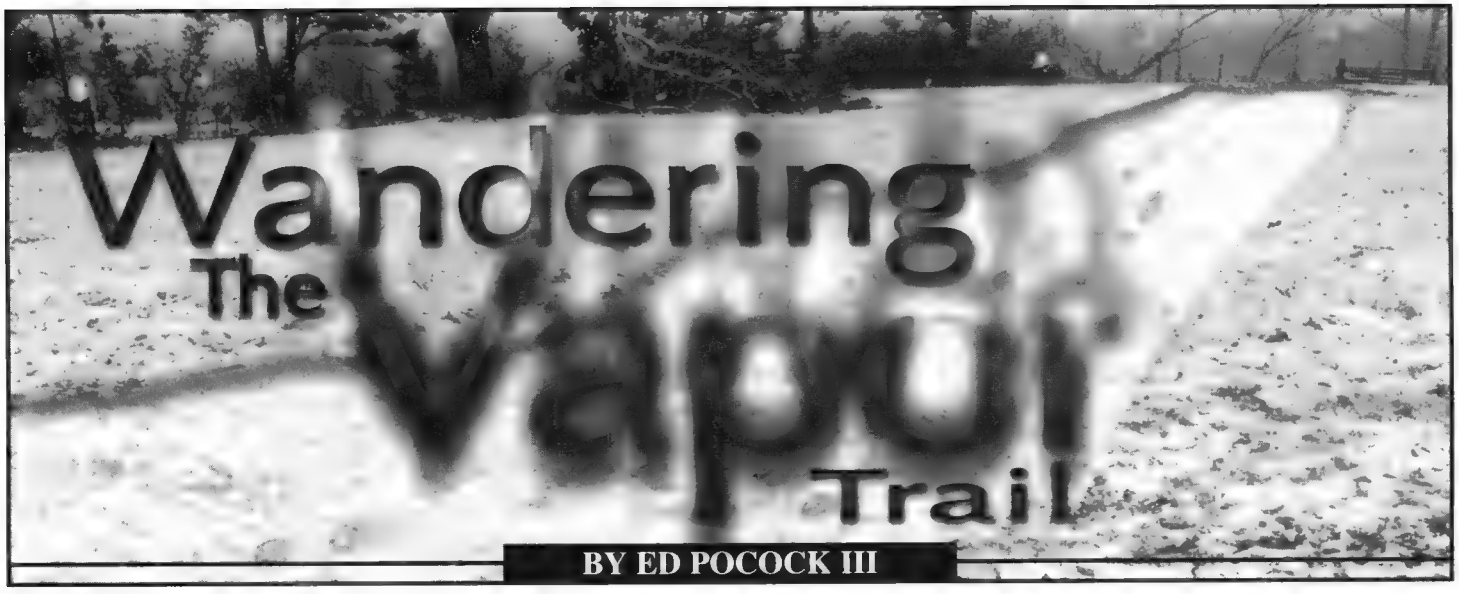
By the time all the smoke cleared, the finalized cartridge became the .270 Winchester with a 130 gr. bullet loaded to a velocity of 3160 fps, and it was announced along with the first Winchester bolt action rifle, the Model 54, in 1925. Winchester had finally overcome the stigma of having been beaten in the velocity race by two lesser known outfits. They then held the velocity record much longer than either Savage or Newton, holding off all American competition for more than a decade.

History has come to recognize Charles Newton as the "Father of High Velocity". But today very few shooters relate Newton's name with the advent of modern high velocity, and only the most dedicated know that his development of the .25 caliber cartridge led to Savage producing the first factory big game cartridge to break the 3000 fps velocity barrier, the .250-3000. Even fewer shooters know that Newton broke the Savage record almost immediately with his .256 Newton from his own factory, moving the record to 3100 fps. Winchester finally offset the velocities of Newton's cartridges with their .270 when they managed to get 3160 fps. This satisfied the number one firearms company of the country, and it brought the velocity race for big game cartridges to stagnation for the next decade. And now we have gone more than 75 years without breaking the next factory velocity barrier for big game cartridges, 4000 fps. Who will be the one to do it...? And can it be done with cartridges that are anywhere near being pleasant to shoot, or will it only come along with recoil beyond that that can be tolerated by average shooters? Only time will tell.

Recently, while sitting out in the middle of one of the country's greatest public grasslands on a prairie rodent hunt, taking in all the majesty of the vast open country, the rolling plains, the table top buttes, little breaks dipping down here and there, I thought of those three velocity record setting cartridges. I have hunted with all three, the .250-3000 Savage, .256 Newton and .270 Winchester, and fully respect each for its special capabilities. The first centerfire big game rifle I purchased was in the .270 Winchester chambering, and the first rifle I gave to my oldest son, Mike, a Christmas gift of so many years ago, was a Savage M99 in .250-3000 caliber. Many years later when I discovered just how fine the 6.5mm cartridges were, I ran across one of the original .256 Newton rifles. That find led to the building of my new, modern .256 Newton on a Sako left-hand action, and it was one of the rifles I had along on that varmint expedition...a satisfying, nostalgic journey back across time.

Bob Jourdan

This is the author's new .256 Newton built on a Sako left-hand action and McMillan stock, topped with the excellent Leupold 4.5-14X scope. This is a fine combination big game-varmint rifle. The wildcat .256 Newton cases are easily formed from either .270 Winchester or .25-06 brass.



BY ED POCOCK III

How many times have you found yourself shooting at a long-range paper target (≥400 yards), and your spotter has absolutely NO idea where your round went. "Where is it?" you wonder aloud to your partner. Hearing your plea, your partner responds with, "I'm trying," as he looks through the scope, "but can't see the bullet hole." You quickly analyze the situation and realize that unless your target is reactive (metal, live & furry, etc…) or comes with a pit crew to mark and disc the target for you, you're flat out of luck. That particular round is gone, leaving you to trust your best *call* on where the round actually did strike. In basic terms: You're shooting blind and once the firing string is finished and the shooter treks downrange to inspect his handiwork, he discovers, more often than not, a nice tight knot of impacts just outside the scoring rings. Net result: Zero points. A real sense of frustration sets in for both the spotter and shooter alike. Glaring at the target, they both wonder silently: Why can't we see the impacts? Good question.

The answer is simple. You're human. Let's face it, looking for a .3-inch diameter hole at long distances is no easy task, no matter how great and powerful your spotting scope is. Then, besides your physical limitations, you soon learn that magnifying the environmental effects of heavy air (humidity) and mirage (no matter how slight) at even low power creates a wavy psychedelic image, reminiscent of an old 70's rock video. Combine these factors and your odds of finding these small holes, at long ranges, is slim.

Now before you bury your head in despair; there are other ways to determine if your bullet is on the right track to the target without seeing the actual bullet hole. The most popular method involves reading the bullet's trace, which is defined militarily as the vapor displacement/ disturbance caused by the flight path of a supersonic or trans-sonic projectile fired through a resistant atmospheric condition from a weapon. The definition of this definition is a little simpler; it's that wavy rippling of air created by the flight of your bullet. Many shooters also refer to this as Vapor Trace or a Vapor Trail.

Another method, which I have used on occasion, is something I like to call 'Glimmer Trace', which can be defined as using reflected light off the bullet's copper jacket to track its trajectory into the target.

Having survived the definition paragraphs, let's move on, tackling each, one at a time.

VAPOR TRACE & GLIMMER TRACE

Vapor Trace

When I first started to learn about Vapor Trace, I found the principles difficult to pigeonhole into rational thought. I was lost. I could see it but couldn't understand it worth the beans. It's like venturing into an art gallery, seeing a famous abstract painting (Picasso's work comes to mind), reading the descriptive placard below, but still have absolutely no concept of what the heck you are staring at. The message is there but the *technique* necessary to understand it requires professional instruction.

I decided to consult SSG Chuck Olsen/US Army Sniper Instructor and my good friend, Captain Bill Huskey/Opelika PD, Alabama. The perfect pair to guide us through the nuances associated with reading Vapor Trace.

When Is Vapor Trace Present?

Throughout my years on the line, I have learned that mirage comes and goes like the wind. Sometimes it's there and sometimes it's not. This is not the case with Vapor Trace. It's present 95% of the time and according to SSG Olsen, Vapor Trace can be observed "…in just about every severe condition in the world, all over the world. I would be willing to say that whatever the location on the planet, out to the atmospheric boundaries, there is indeed trace to be observed in bullet flight."

I specifically asked about conditions where humidity was nearly non-existent, like in the desert, since many folks seem

Continued on next page

Wandering The Vapor Trail *Continued*

to believe that humidity is a necessary element to see Vapor Trace. He provided several examples that included 126 degrees F, dry desert, with a 50 MPH wind, where he could still see Vapor Trace (answering my persistent 'low humidity' question) and countered that with a equally chilling cold weather example, proving that trace is visible in these conditions too.

For you night owls, he went on to say that Vapor Trace can even be seen at night with a thermal device and that it is actually more visible at night, using that device, than during the daytime. When I find my first $12,000 dollars to buy such a unit, I'll have to give it a try but until that time, I'll take his word for it.

The bottom line: It's there. While easier to see when the air is humid (or with a thermal sight), Vapor Trace is present if you know How to Find It.

How to Find It & Read It, Step-by-Step. As with any new technique, the best way to learn is to take things one step at a time. We'll start with the basic element of positioning first and move on to actually understanding Vapor Trace.

The Foundation. "Positioning is critical", according to Capt. Huskey, "and is best viewed from directly behind the gun being fired. This is usually a position further behind the shooter's shoulder, in line with the weapon's bore." Both Capt. Huskey and SSG Olsen slammed this point home as the foundation to spotting a bullet's Vapor Trace and strongly suggested that spotters remain within a maximum angle of 15 Degrees (0 Degrees is best—and is considered the shooter's bore line) off the shooters actual bore line (Refer to Photographs #1, #2, #3, & #4). Again, no more than 15 degrees.

There are a few reasons for this. **By positioning yourself behind the shooter, as shown:**

1) Your ability to see trace during less than favorable conditions (low humidity, windy) is significantly increased. Nearly a certainty.
2) The observed Vapor Trace is not distorted due to an optical illusion that results when the spotter is angled off the shooter's actual true bore line by more than 0 Degrees. The greater the angle off the shooters bore line, the worse the illusion. Capt. Huskey concludes that, "Any side viewing makes the trace look like it is off centered to the side of the target opposite your position, when in actuality, the round is going straight through the 'X'. Like concave and convex lens refraction's. In a nutshell, the further to the side you are, the harder it is to judge where the true strike is." This, of course, can lead to false corrections by the spotter who was watching the observed Vapor Trace. That, folks, is bad.
3) Your eye will need to do less tracking work and can better exploit the human eye's quick focus speed. It's much faster than the tracking speed of the eye (more on this later).
4) Your ability to spot short distance (< 400 yards) Vapor Trace, if that ever becomes necessary, is significantly increased. Even small angles off the shooter's bore line cause the Vapor Trace to be lost. As a general rule: Longer ranges show better trace, while shorter ranges are more difficult to see. Positioning is extremely critical when trying to find a short range Vapor Trace.

Now that the foundation to best view Vapor Trace is clear (positioning is a big part to your success in mastering this), the technique to understand those rippling airwaves can be better understood.

Optics. In order to 'read' the Vapor Trace; a spotting scope will be necessary. Use a good quality spotting scope. I can't emphasize this enough. Don't buy junk. They not only assist in seeing trace but also, as a side note, increase the range where bullet holes can be observed in the target (a good spotting scope allows .30 calibre bullet holes to be seen out to 500 yards—on a good day).

Using Optics to 'Read' Vapor Trace.

1) Focus the spotting scope halfway to the target, as if you were reading mirage, *or* some distance beyond the target to see the bullet's Vapor Trace more clearly. If you focus the spotting scope on the target, you will probably miss it. Your eye should be watching the slightly blurry target, waiting for the first signs of trace to show in your peripheral vision. The first sign of trace is usually when the round reaches its maximum ordinate.
2) Since maximum ordinate is where Vapor Trace makes its debut in your spotting scope, it's *critical* that you know the maximum ordinate of the ammunition fired. This is important for two major reasons:
   a) By knowing the approximate area where the maximum ordinate will appear, the spotting scope can be set up to catch maximum ordinate in its field of view. Failing to do this will cost you precious milliseconds needed to pick up on the Vapor Trace.
   b) Knowing the maximum ordinate of your partner's round is also handy when the maximum ordinate is seen much lower than where it should have been. For example: A .308 Winchester round fired at a 600-yard Highpower bull, at a distance of 600 yards,

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should make its maximum ordinate Vapor Trace debut in your peripheral vision at about 12 o'clock, right above the top of the cardboard backing (if the windage is correct). A lower appearance, let's say around the 'X' ring, would warn the spotter immediately that the elevation setting is probably wrong. This tip is especially useful on elevated targets that have no visible impact area behind them and as a quick fix for elevation problems.

3) Maintain a watchful eye on the desired target—resist the temptation to focus on the maximum ordinate trace, thinking that you can track the trace in. Instead, let your eye's quick focus time do the work for you (an eye's focus time is much faster than its tracking time). Use your peripheral vision to pick up the maximum ordinate. Then, milliseconds later, you will see the Vapor Trail appear to 'speed up' as it approaches the target. Upon reaching the area of the black bull's-eye, the trace may be lost for a moment (the darker background makes the Vapor Trail more difficult to pick up on) but you will see it just before it passes through the target. Often, there is the ripple effect on the paper as the round impacts (of course the furry targets don't exactly ripple). Keep in mind that you won't see the actual bullet hole but **will** see what appears to be a small 'area strike'. It's from this observation that you make necessary corrections for your shooting partner.

4) Special conditions. On very dry days (whether it's New England cold or Arizona hot) with a stiff wind, turn down the magnification a bit on the spotting scope. Focus beyond the target 200 yards, if possible. In these conditions, a Vapor Trace is difficult to find but it can be done, whereas any other method, such as finding a bullet hole, is out of the question due to heavy mirage.

Going Thermal. For those of you lucky enough to have thermal devices, another tip, courtesy of SSG Olsen. Place the sight in the 'black hot' position. Then position yourself as described earlier but high enough over the weapons muzzle so that the heat generated from the shot doesn't wash out the sight's vision. According to SSG Olsen, "This will be the easiest trace you have ever seen."

Training Issues. During my lengthy conversations with several experts on

Continued on next page

MODERN HIGHPOWER COMPETITION
FROM BEGINNER TO MASTER

BY RANDOLPH CONSTANTINE

Popular *Precision Shooting* columnist Randolph Constantine spent two years in the preparation of his major work on Highpower rifle competition. Now finally available, it has over 600 full-size (8½ X 11") pages and over 100 illustrating photos and is remarkably reader-friendly in its approach to an occasionally daunting subject. As the book's title relates, the erudite Mr. Constantine sets out to explain the hows and whys of one of the most popular of the shooting sports over 25 informative and logically progressing chapters. The chapter titles give a good idea of what you will find in our pages...

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Wandering The Vapor Trail *Continued*

this subject, each had the same conclusion on mastering this spotting skill. **Practice.** Captain Huskey probably put it best: "Go to a Known Distance (KD) range with one rifle and the same ammunition, preferably with the sun directly behind you (makes taking the baby steps to learning this art that much easier). Then once you pick it up, play with your positioning to maximize visibility. Do this at a particular distance until you can find the trace and follow it into the target with regularity. Once mastered move on to other distances and repeat it. After you get to the point where you see the trace and call the strike with 90% accuracy, then it's time to change both the location and the light conditions. Starting all over again."

Once proper positioning and the above techniques are applied and practiced, Vapor Trace can be seen going up, curving out, curve back in (windage adjustments in play—if used), and ultimately pass through the target, in such a way that accurate shot placement information can be passed onto the shooter. It's truly a beautiful thing to behold especially when your possibilities of seeing an actual bullet hole, in the target, is nil.

Glimmer Trace

In years past, before I was able to understand Vapor Trace, I depended on three different methods to know where my round went at long distance.

1) Employ a pit crew (the best method but limits you to a range designed for this purpose) or use some type of a reactive target.
2) Seeing the actual bullet hole (good to about 500 yards on a good day).
3) Using a method I've coined as 'Glimmer Trace', which is a condition that occurs on bright days, when sunlight glimmers off of the bullet's copper surface, allowing it to be seen, rather easily, flying towards its target. Almost like a dull tracer.

Now before I'm told that there is a material behind most barns that fills my body consider some of your past experiences while shooting **low** velocity rounds. Nearly everyone who has fired a 45ACP has, at one time or another, seen the slug flying through the air as it sailed towards its target; or barring that experience, anyone that has fired a BB gun, using Copperhead™ BB's, has surely seen a BB fly through the air while plinking tin cans. These are examples of Glimmer Trace.

While being more of a novelty at close range ("Gee look, I can see my bullets"), the occurrence of Glimmer Trace can be seen on **high** velocity .308 Winchester rounds as well and I have included it here as just another tool that can be used by a long distance field shooter.

When Is Glimmer Trace Present?

Glimmer Trace, when concerning high velocity rounds, is normally limited to sunny days, although it has been observed on hazy days too, where the round, as it travels to the target, is exposed to sunlight. This sunlight is then reflected off of the bullet's copper jacket and viewed by the spotter (I have no data, at this point, if this phenomena can be seen with moly coated bullets).

The angle of the sun, relative to the shooter and his target, plays an important part in how visible (strong) the glimmer is. A Full Value to 3/4 Value Sun (Refer to Illustration 1) provides the best chance to observe Glimmer Trace. At Sun angles of less than 3/4's Value, the shine becomes less obvious, almost dull in appearance. A from the rear Zero Value Sun is very hard to see and is usually a low flicker rather than a steady shine. I have not yet seen a Glimmer Trace occur during a from the front Zero Value Sun.

It's also important to note that if the bullet enters a shady area, you'll lose the Glimmer Trace. Simply put: No sunlight, no glimmer.

How to Find It and Read It. Finding Glimmer Trace is really quite easy. Normally, Glimmer Trace can be first seen when the round is about 100-200 yards

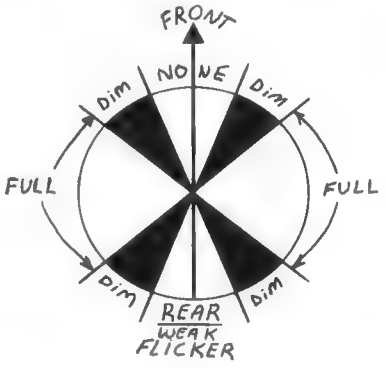

ILLUSTRATION 1. The position of the sun has a lot to do with how visible Glimmer Trace will be to an observer. Full Value sun, out to 3/4's Value is best.

Photo 1: Sniper Rob Cook and his observer J.W. Huskey, demonstrate the best possible position to observe Vapor Trace. Photograph by Pamela Rogers.

away the shooter's position. It's here that the Glimmer Trace is usually first picked up and followed into the target. Darn close to watching an actual tracer go through a target—pretty simple to read actually. Finding Glimmer Trace isn't that difficult either but the following tips will make the job that much easier.

1) The position of the spotter is not as critical as when reading Vapor Trace. We have found that nearly any position behind (or on the side of) a shooter can and does work.
2) Glimmer Trace can be seen without the aid of optics, although we did find that the use of a pair of IOR 10x40 binoculars (awesome glass) helped make the job a heck of a lot easier. This is especially nice when the use of a spotting scope is not practical, especially when you find yourself in a horrible position that won't allow for the perfect sniper/observer style position shown in Photographs #1, #2, #3, & #4.

Closing

Hesitation and doubt are probably the two biggest factors that stop good riflemen from employing these bullet-tracking methods. Doubt clouds the soul of open-minded thinking and hesitation is the evil stepmother of procrastination. Don't let your field performance be hindered, whether in the practical field shooting arena or in varmint eradication. Instead, turn your miss(es) into solid hits. Good shooting.

(Special thanks to Captain Bill Huskey and SSG Chuck Olsen for their help with this article.

Ed Pocock III is a Sergeant with the Southington Police Department and has been involved in sniper related competition since 1994. He can be contacted on line at e-3@prodigy.net.

A side shot of the same position shown in Photo 1. Those white splotches in the photo are snowflakes—in ALABAMA! I thought they were shooting these photos in New England. Photograph by Pamela Rogers.

Braving the harsh tundra like conditions in central Alabama, Sniper Rob Cook and Observer J.W. Huskey continue on, showing another view of proper positioning. Photograph by Pamela Rogers.

Huskey (Observing) has that, "Yes, Eddie, it does snow sometimes in Alabama" look in his eyes. Another great example of positioning.

Custom Stocking A FARQUHARSON

PART 2 & 3

Fitting the Machined Stock

BY DOMINICK PISANO

Now that the client was satisfied with the work so far, I sent the pattern along with a lovely piece of English walnut off to be machined. All the dimensions were a bit large, but that's OK. It's easy to trim wood. I have never figured out how to grow wood back when something is undersized. This is a corollary of the "measure twice, cut once" rule of stock making.

Two weeks later the machined wood was returned. This is one of those defining moments for a custom stock maker. We have a pretty good idea what the machined stock is going to look like. But sometimes we're surprised. I was indeed surprised. The machined stock was even better than I thought it would be (see photo 13). This was important, as I suggested that the client purchase this stick over another that was his first choice. Now I knew he would be pleased.

It is always my preference when fitting a machined single shot stock to first fit the upper tang. Once that's done it is easier to fit the lower tang and get a water tight fit against the receiver. This is easy to do with actions that have removable lower tangs such as the Winchester 1885 and the Remington Rolling Block. The Farquharson however, has both tangs permanently attached to the receiver. So I simply turn the machined stock upside down, and then fit it to the upper tang. This may seem a bit odd till you get used to it, then it seems quite natural. I fit the upper tang to the stock till it's about 1/8" short of touching the rearmost portion of the machined inletting.

There are a couple of things to look out for when fitting receivers with tangs. If the tang is untapered, the marking agent will rub off on the sides of the tang onto the wood as you slip the stock into place. You may be tempted to remove those spots. Don't! They might not be high spots. The marking agent can rub off if you have a good slip fit, which is what you want. If you remove them you will create gaps.

Unfortunately, there's no way I can better describe this. It takes experience and practice to know whether it's a high spot or a good slip fit. If you continue to remove marking agent you're probably creating gaps and you will later wonder how they got there. It's a good idea to stop every now and then and just think about what you're doing. Let your brain catch up with your hands.

Photo 13

If the tang is tapered, as the upper tang is on the Farquharson, the same technique works. Of course it's important to remove the sliding safety to get it out of the way. Carefully fit the upper tang using the marking agent of choice. Lightly tap the wood toward the receiver as you go. Do not slam the stock too forcefully, you run the risk of splitting the stock as the tapered tang acts as a wedge. Also you run the risk of spreading the wood from the wedging action. You need to be aware of this, or you will again wind up with ugly, unprofessional looking gaps (and ruin a perfectly good piece of wood). I use a small clamp at the leading edge of the stock to keep the wood from wedging out.

Turn the machined stock right side up. With the solid reference the top tang has given you, begin to fit the lower tang and tenons to the receiver. Try and fit, try and fit, each time scraping away the high marks as shown by the marking agent. Most people use a variety of scrapers to do this. I use the Dremel tool with a variety of rotary diamond and carbide rasps. The Dremel is handy, and fast, but if

you're not used to it, CAUTION, it can get away from you and do all kinds of damage to your work.

When the lower tang is fitted so that the front of the stock is about 1/8" from home, turn your attention to fitting the tenons that fit into the mortices in the receiver. These tenons serve the purpose of keeping the stock from spreading apart behind the receiver. Remember that the wood is pretty thin along side of the wrists on most single shots. The Farquharson is no exception.

Since this Farquharson had a stock bolt added to it, I use it for the final fitting to get the stock up against the receiver as tight as I can. Warning. Don't use the stock bolt to force the stock home. You might split the stock. The stock bolt develops a lot of torque as you turn it up tight. Remember to go slowly. Stop and think. If you feel yourself getting tired, go on to another project, or take a break. Trying to get just a little more done is the way to ruination. Know your limits and stop when you have reached them.

When I'm satisfied that the stock is properly fitted, I clean up the action of accrued wood dust, debris, and marking agent. Ditto the wood. Then I liberally coat the receiver inside and out where it joins the wood, with Johnson's paste wax, preparatory to applying epoxy. It's a good idea to use modeling clay inside the receiver to prevent epoxy from getting places where you don't want it. Better safe than sorry. I butter the mortices for the tenons with epoxy so that everything will become super tight. Epoxy won't hide mistakes. But it will add considerable strength, and waterproofing in those places where it's most needed. I undercut the sides of the wood inside the tang inletting with a small rotary rasp to further add surface area for the epoxy to adhere to. You will see no evidence of epoxy on any of my stocks unless you disassemble the rifle.

After waiting 24 hours, remove the stock bolt and separate the wood from the action. This may take some doing as you have worked hard to make the fit as tight as possible. A rap or two with a mallet on the comb nose (protected by a piece of leather) will usually loosen the stock so you can pull it free.

Then carefully clean up excess epoxy that has oozed onto the wood with small rasps and abrasive paper. Clean out any and all epoxy that remains within the action now as well. You might as well find out now whether epoxy has gotten into places it shouldn't have (see photo 14).

This is the perfect time to fit the steel buttplate. Please, please don't use a recoil pad unless you're dealing with a big bore African gun. The steel buttplate looks ever so much better. Using a band saw I cut the rough outline of the buttplate a little longer than the length of pull (LOP). Then using the try and fit method with lipstick as the marking agent I begin the process of fitting the buttplate. As the buttplate nears being fully seated I drill the appropriate holes in the stock and use the stock screws to complete the job, pulling the buttplate tightly against the end of the butt until I have achieved a hairline fit. Again, I use epoxy under the butt plate to seal the wood. This is end grain and is likely to wick up moisture like a sponge if not well sealed. A well fitted buttplate is a mark of careful craftsmanship.

The next step is to use the receiver, and the steel buttplate as guide lines, to begin the final shaping of the stock. Even though the wood was machined from a pattern, in this case one specifically made for the Farquharson project, it was necessarily made somewhat oversize in order to allow for adjustment in the final fitting and shaping.

Photo 14

I begin with the receiver end and carefully rasp the side panels down to meet the metal. Remember, there is a protection tape on the receiver to prevent accidental marring of the steel. Work slowly and carefully until the rasp just begins to touch the protective tape. Take it slow. Don't forget to leave the slight flair to the side panels. It's a nice custom touch. Cautiously round off the rear of the panels being careful to keep the edges sharp and clean. Then begin the same process on each tang. Remember you don't want to change the basic shape of the side panels as you do this. Just follow the shape of the metal and make certain the lines continue to flow naturally into one another so nothing is jarring, or out of place.

Next, continue shaping along the lower tang to the front of the pistol grip. The PG serves as another layout line. Come right up to the PG cap, but try not to mar it with the rasp. As the bottom line of the wrist is complete, continue to work your way around the PG cap, rasping away excess wood. Be sure to carry the line of the PG cap up through the wrist so that you don't wind up with a swollen looking wrist. Remember it's supposed to be graceful looking! Be very careful as you work around the front edge of the pancake cheek piece. This requires care as there isn't much room to maneuver. This is where a good selection of files and rasps of various sizes and shapes is ideal. Among them should be a fair assortment with safe edges so that you don't cut into the cheek piece as you refine the shadow line.

When you're satisfied that you've gone just about as far as you can go in shaping the wrist and the area from the PG cap forward to the receiver, including the side panels, it's time to turn your attention to the rear end of the stock. Now begin the process all over again, this time using the steel butt plate as the

Continued on next page

Custom Stocking A Farquharson Part 2 & 3

Continued

outline. You might have anywhere from 1/16" to 1/8" of wood to remove. Don't think all you have to do is bring the wood down to the buttplate just adjacent to the buttplate. To properly shape the stock you must work the entire butt. In other words, if you choose to work the offside (the side opposite the cheekpiece side), use the rasp to work the entire side until you just barely touch the metal of the buttplate. Use a straight edge often to gauge your work. This can be a tedious process. But the only shortcut I know of is to use the coarsest rasps you can find. Be mindful that as you approach just touching the buttplate that you are not using a rasp that will leave gouges that can not be removed with finer cut rasps, and abrasive paper.

Now is a good time to work the line from the nose to the steel buttplate. Be sure this line is straight. Check your progress with a straight edge from time to time. Ditto for the line from the toe to the area immediately behind the PG where it joins the stock proper.

The off side is the easer side to do, even though you may be removing more wood than the on side. The cheekpiece side, requires a lot of patience and care. Begin by working the area behind the cheek piece down as close to the metal as you are comfortable with. You are working across the grain here, and the scratches must later be carefully smoothed out. Once that is accomplished you must then rasp from the buttplate to the side of the PG below the cheekpiece. This line should not have any hump in it. Use a straight edge to constantly gauge your progress. A variety of different size rasps is a must, and some with safe edges makes life easier as you work beneath and around the cheek piece. You don't want to spoil the shadow line or change its dimensions at this point. Once you're satisfied that you've rasped away all the excess wood it's time to step back and examine your work. It's not a bad idea to do this from time to time to be sure you haven't gotten carried away.

If anything makes or breaks the looks of the stock and a professional looking job, it's the cheek piece. Truth be told it's really not that functional and is more of a design factor than anything else. Be that as it may, it *IS* the mark of an outstanding looking stock. Conversely it can be an abomination, usually because they are too large and totally out of proportion. I'm not at all certain that a cheekpiece can be made too small, but I have seen my share of them that are too large.

The foregoing can take several hours or more of painstaking and careful work. Let's step back and review what we've just accomplished. We have used the receiver and tangs, steel PG cap and butt plate as pattern outlines to get the basic lines of the stock to come together as a pleasing whole. Once we're comfortable with what we've achieved, we can begin working the cheekpiece. We want it to look like it belongs on the buttstock, and not an appendage that just happens to be there. If you suspect that the cheekpiece is too large (and it probably is), very carefully use a rasp with a safe edge to work the shadow line into a pleasing shape.

I like to start with the top rear of the cheekpiece and work slowly around the outline removing wood. Draw an outline with a pencil or a bright felt tip pen. Don't be afraid to sand it off if you don't like what you see. Keep removing excess wood slowly and carefully, being certain to continue working your way all around the cheek piece. Don't try to get one small portion of it to the correct size. You may discover that it's become misshapen without your realizing it. Keep stepping back to check your work. This is where those safe edge rasps come into their own. The safe edge will allow you to rasp the shadow line without gouging the base of the stock. You will notice that as you continue this process, the neat little shadow line will get deeper and deeper. It can be anywhere from 1/8" to 3/16" high in some places. Not to worry; we'll take care of that later.

The shadow line is one of the marks of true craftsmanship. I like to taper it starting from the base of the stock to 1/16" or so and gradually increasing its height to a bit less than 1/8", then taper it back down again. On a tear shaped cheekpiece it simply disappears into the wrist about midway up from the PG. On a pancake type cheekpiece, such as we have on this project the front taper is less than 1/16" and the cove is rather small. If you've never done one before, it can be frustrating. Rat tail files are handy for this work. Take your time. As you taper the shadow line you can also alter the cove surrounding the cheekpiece. Some people like a faintly steep cove. I like the cove to be moderate in size. It defines the cheek piece and gives the optical

Photo 15

Photo 16

illusion that it is larger than it really is.

When you think the cheekpiece is of the size and shape that you're pleased with, it's time to check out the lines once again with a straight edge to be sure that there's no hump beneath the cheekpiece. There probably will be. Rasp it flat and straight.

The area between the cheekpiece and the buttplate should also be flat and straight. It's easy to rasp a hollow in the wood about midway between the rear of the cheekpiece and the buttplate. Use a straight edge to check this out. If there is a hollow, carefully determine where wood should be removed. It's usually in the area immediately adjacent to the rear of the cheekpiece. Plane this area down using a fine cut rasp with a safe edge. Be careful with your rasping here since you're going cross wise to the grain. There's no getting around this, so don't make any deep scratches. Then finish up with a smooth cut cabinet makers rasp which planes away excess wood rather then gouge it out. These come with safe edges as well, which will keep your shadow lines crisp. Let the rasp do the work. Don't bear down on it. Be particularly careful when cleaning up the area in front of the pancake cheekpiece just below the nose of the comb. This area is awkward at best. Just go slow, and take your time (see photos 15 & 16 on page 43).

Part III

Making the Forend from Scratch

Compared to making and fitting the buttstock, the forend is a relatively easy task. This one will be a bit more complicated than most because the client requests a Purdey type forend which is peculiarly English looking in shape. It is a short forend, no more than 10" long, tapering from the depth of the receiver front to less than one inch at the forend tip. It has an ebony tip and three panels. One on each side and one on the bottom.

The side panels should look identical to the panels on the buttstock even though the depth of the rear of the receiver is less than the depth at the front. Try to get them to look similar by getting them in scale. The bottom panel will have a gothic arch shape to add visual interest.

Since the forend is being made from scratch it's a good idea to make some sort of pattern. I used the photo the client sent me and enlarged it on the photo copier using the receiver as a scale to get the proportions right. There are probably more scientific ways to do this, but then again the copier works just great. Next I route out the barrel channel. I make no effort to get the channel perfect. I just want to hog out as much excess wood as possible. I usually leave the channel about 1/16" undersized for final fitting.

Once again I use the "upside down" method (see photo 17). That is I fit the wood to the top of the barrel. This is done for two reasons. The stock attachment lug is in the way and makes it more difficult to fit the barrel and the lug at the same time. Also the front of the receiver has a convex lip at the bottom. By getting the barrel channel fitted, it will serve as a reference as I begin the work of cutting out wood for the attachment lug. I do this with drills and chisels and make it oversize so I will have room to slide the forend back to the receiver to fit the aforementioned lip. Contrary to the general theory, I like a water tight fit of the forend to the receiver.

Once I'm satisfied that the barrel channel is fitted satisfactorily, I begin to fit the forend to the front of the receiver. The first step in this process and one that will make life easier is to square up the end that fits up against the receiver. That will allow you to concentrate the on the trickier aspects of fitting the forend, especially fitting the convex curve at the bottom of the receiver to the metal.

I place tape on this curve, carefully remove excess tape, then peel it off and tape it to the roughed-out forend. Trace the curve unto the forend and remove the tape. Then I carefully remove excess wood almost up the tracing, allowing enough for the final fitting. Works great. Use the tried and true marking agent method of try and fit, remove high spots, try and fit again and again until the perfect fit is achieved. Keep the forend squared up as it is slowly moved back to the receiver face.

Once that's accomplished, I trace the full pattern outline on to the forend blank and cut away the excess wood with the bandsaw leaving enough wood for final shaping (see photo 18 on page 36). At this point I draw the side panels, roughly approximating the panels on the buttstock, and the bottom panel. With the completed forend in my mind's eye, I begin the process of shaping the panels by using my Dremel tool with a round rotary rasp to outline the panels. I deliberately leave the panels oversize so that I can make adjustments as I continue to work on the forend rasping away excess wood. Take breaks often and step back to admire your handiwork. This will give you an opportunity to gauge your progress, and not make foolish mistakes. This can easily happen when you've the task of removing a large amount of

Continued on next page

Photo 17

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Custom Stocking A Farquharson Part 2 & 3

Continued

excess wood. You may find as I did that the panel outlines had to be deepened several times and the panels cut down and carefully shaped to get the proportions just right. As you approach the final stages of shaping it's a good time to attach the forend to the barrel. This will allow you to do the final shaping and sanding with the forend firmly attached, and you can use the barrel as a handle for this work (see photo 19).

There are several schools of thought for attaching the forend to the barrel. Some believe the barrel should be free floated except the area immediately surrounding the forend screw. I don't use that method and tightly bed the forend to the barrel. Others insist that the forend should not bear up against the receiver. I bed the forend in a water tight fit against the receiver. Most single shot forends are relatively small in comparison to the bulk of the barreled action. This pertains to both Schuetzen and black powder cartridge rifles. I can not believe that these tiny forends impact accuracy in any way by introducing pressure on the action. Most of my clients are in agreement with these findings.

Now on to the actual attachment. I use the screw and escutcheon method attached directly into the barrel, or into a lug dovetailed into the barrel. It all depends on the diameter of the barrel and the bore size. For those cartridges producing substantial recoil, I insist on two screws as the recoil can produce sufficient inertia to shear the screw. I learned this the hard way when I stocked a Ruger #1 and the client commenced using max loads in a 45-70. Since this Farquharson is chambered for the 22-3000, and is of sufficient weight to absorb recoil, one screw will be sufficient.

There are a number of techniques for drilling and tapping the barrel/lug in precisely the exact location. My technique involves being certain that I have fitted the forend to the receiver in a hairline perfect fit. Carefully tape the forend to the barrel using enough tape to be certain the forend will not shift from its position. Clamp the action on the drill press table making certain that the top (bottom) of the barrel is top dead center and the drill bit is perpendicular to the bore. I use a brad point drill that is the exact diameter, or fractionally smaller than the escutcheon (I use brass escutcheons that are vertically striated so they will not turn once set in place). Drill to a carefully determined depth spacing the escutcheon just below the surface of the wood.

Remember final minor shaping and sanding that allows sanding the wood flush with the escutcheon is yet to come. The brad point bit is removed (do not disturb the set up) and replace it with a drill bit that is fractionally larger than the screw you intend to use. The indentation of the brad point serves as a guide for this bit. Drill down to the metal enough to dimple it. Then carefully remove the forend so as not to disturb the set up, and drill the hole in the barrel, using the correct bit for the screw you intend to use. Drill to the correct depth using the previously formed dimple as a location guide. Works great.

After this is accomplished you can tap the hole. Accomplish any final shaping and sanding with the forend firmly attached to the barrel. It's also a good time to check that the forend is symmetrical because the screw should be perfectly centered in the forend.

It's time to get out the abrasive paper and begin prepping the stock prior to applying finish. But since this article is primarily to describe the design of the customers pattern and the principles involved in that effort, and the technique of fitting and shaping of the stock once it's machined, I leave the prepping for finish work and the finish technique to another time.

To be continued…

Photo 18

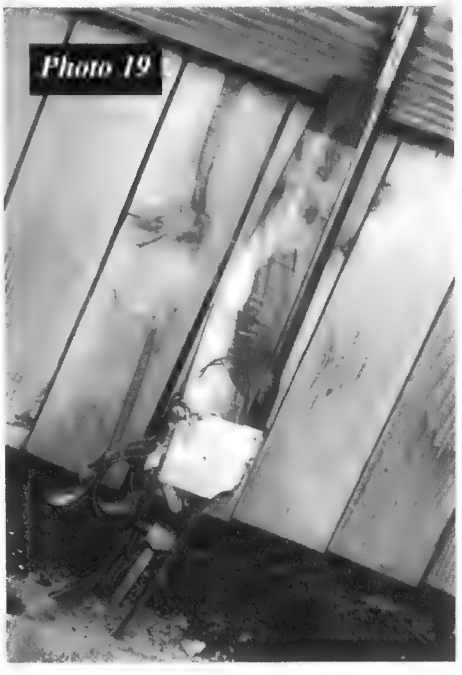
Photo 19

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The 5.6 x 61 Vom Hofe Super Express

BY J.C. MUNNELL

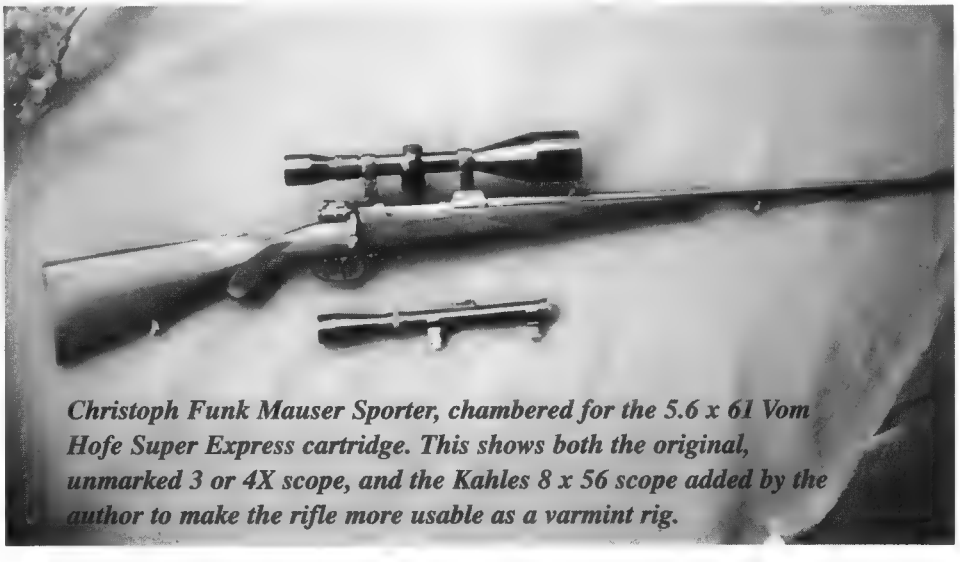
In my seemingly never-ending quest for "interesting" guns and cartridges, it occasionally happens that I try to bite off considerably more than I can chew. Sometimes, I even succeed quite decidedly. Happily this is not one of those times, despite more than the normal problems in securing the basic components for beginning the reloading process, and it does serve as a good example of how perseverance can pay off.

Such was the odyssey which began in October of 1987, when I answered an add in *Gun List* for a German Mauser M-98 sporter chambered for the 5.6 x 61 Vom Hofe round (or, to give it its full and proper nomenclature, the 5.6 x 61 Vom Hofe Super Express—5.6 x 61 VHSE). Since the price was acceptable, and since I had never loaded for this cartridge, I immediately purchased the gun, complete with a scope, probably of 3 or 4 power, and of some unknown German manufacture.

While the gun was in transit, I began the interesting chore of researching the origins and purpose of the cartridge, and getting ideas for reloading components, tools, etc. According to Cartridges of the World, the round was introduced in 1937 by E.A. Vom Hofe, a very respected and accomplished cartridge designer and gun builder. As can be expected, given the state of the Western World in 1937, not a whole darn bunch of rifles were so chambered for a number of years thereafter. Fortunately, the cartridge (and its rimmed version, intended for use in break-open single-shot and combination guns) was re-introduced in 1962, and continues to enjoy some, albeit limited, popularity in Europe today.

Although we Americans would note the .228" bore diameter of the Vom Hofe round, and immediately think "varmint caliber", such was not its originally intended use. In Europe and Asia, Chamois, Roebuck (Rehbok) and the like are often hunted from mountain peak to mountain peak. These are relatively small and delicate animals and do not require guns chambered for large-bore rounds, with their necessary weight and bulk. Thus, a 7-pound rifle, chambered for a fast-stepping small-bore round is ideal. However, an American varmint cartridge, with its frangible bullet does not fill the bill—the bullet must be capable of penetrating the vital organs of an animal weighing perhaps 100 pounds, and possibly facing the shooter, or, perhaps even presenting the ubiquitous "Texas heart shot". The 5.6 x 61, therefore was loaded with a 70 or 80-grain bullet of fairly stiff jacket and attaining a muzzle velocity of 3600-3700 f.p.s. (Ballistically sort of like the "modern" .22 CHeetah, or the only-slightly-less-modern .228 Ackley Magnum, eh ?)

In the dim recesses of my mind, I recalled an early article in *Rifle* magazine



Christoph Funk Mauser Sporter, chambered for the 5.6 x 61 Vom Hofe Super Express cartridge. This shows both the original, unmarked 3 or 4X scope, and the Kahles 8 x 56 scope added by the author to make the rifle more usable as a varmint rig.

on the 5.6 x 61 VHSE. Checking my index, I found that in issue #13, back in 1971, an article had, in fact, been written on this round. Digging out my copy of this volume, I was surprised and delighted to find a picture of the exact gun I had just acquired as the primary subject of the article. Such feelings of joy, however, soon turned to serious doubt, both of the future of this particular project, and of my own sanity. (The project's future, at least, turned out o.k.) It seemed that loading data was scarce, and brass was even more scarce. The crucial head diameter of the subject case was .476", some .008"-.010" larger than the standard .30-06 or 8 x 57 mm case. Further, the 61mm case-length precluded use of the nearest suitable case—the 6.5 x 55 Swedish Mauser. (At that time, no one was importing the excellent Walter Gehmann brass. Today it can *occasionally* be found through Huntington Die Specialties or The Old Western Scrounger. Also, Bertram produces the rimmed case, and it is *possible* to turn the rim off and cut an extractor groove with a lathe. **However**, I recently experienced a rather catastrophic case failure attempting a similar conversion of the 5.6 x 50R case to 5.6 x 50 Magnum, and I would *strongly* advise against such conversions.)

Not being a bashful sort, and realizing that the author of the 1971 article was not only very much alive and about, but had even risen in the publishing ranks considerably beyond a mere scribe, I wrote to him, and inquired whether suitable brass was then available, and whether, some 16 years later, he had any additional loading data for our subject cartridge. In due course, I received a response, succinctly stating "No" and "No". Then, apparently assuming me to be a rather young, even though inquisitive, sort, and in need of proper remonstration, he allowed that these were questions I perhaps should have asked before I purchased the (his!) gun, and further allowing as how perhaps the entire world might be better off if I relegated the rifle to purely wall-hanger status.

Now, other than possibly an exceptional pair of female human legs, absolutely *nothing* will get my blood flowing faster than telling me I can't do something. So, back to the books and calipers. Lo and behold, it turns out that Norma 9.3 x 62 brass is actually .473" in head diameter, not the oft-quoted .468". Now "all" I had to do was figure out how to squeeze a 36-cal. case down to hold a .228" bullet, then do it 20 or 40 times.

One of the advantages of having reloaded for over 150 different cartridges, is that *usually* I can find a die in the closet for any chore. (Incidentally, **never** include the dies when you sell/trade a gun. Nobody will give you a nickel more, and when you acquire another gun in the same caliber, you'll just have to buy more dies; advice from a guy who bought, perhaps, six sets of 8 x 57 and .30-06 dies, before finally learning this lesson!) Approximately two hours later, I had successfully formed my first 5.6 x 61 VHSE case. The process goes like this:

1. Size the *unfired* Norma 9.6 x 62 case in a .350 Rem. Mag. full-length sizing die, pushing the shoulder *slightly* back by turning the die in another 3/4 turn beyond that necessary to size the entire neck;
2. Size neck (only) in 7.5 x 55 Swiss sizer die (Remember, the die must be *larger* in the head than a .30-06);
3. Size neck (only) in .284 Win. sizer die;
4. Size neck (only) in 6.5 Rem. Mag. sizer die;
5. Size full-length in 5.6 x 61 VHSE sizer die;
6. Trim to 2.395";
7. Fire-form in gun (30.0 gr. 3031 with a 70 gr. bullet works well)
8. Thereafter, load as for any bottle-neck cartridge.

Notes: Only step #5 requires case lubrication;

Leave progressively shorter neck with each successive die: necks will "iron out" after a few firings;

Remove expander plug from all but 5.6 x 61 die;

In neither of the two rifles for which I have formed brass in this manner, was it necessary to ream or turn case necks, dispite reducing diameter from 36 to 22 caliber;

Cases formed in this manner have the same internal volume as DWM brass (if you can find any), and only Approximately 2 gr. less than Gehmann brass; loading data will interchange between brass types;

Cases formed in this manner have lasted for 10-12 full power reloads without any failures;

RCBS, Redding and C-H/4-D all make dies for the 5.6 x 61, although all companies consider such as special order.

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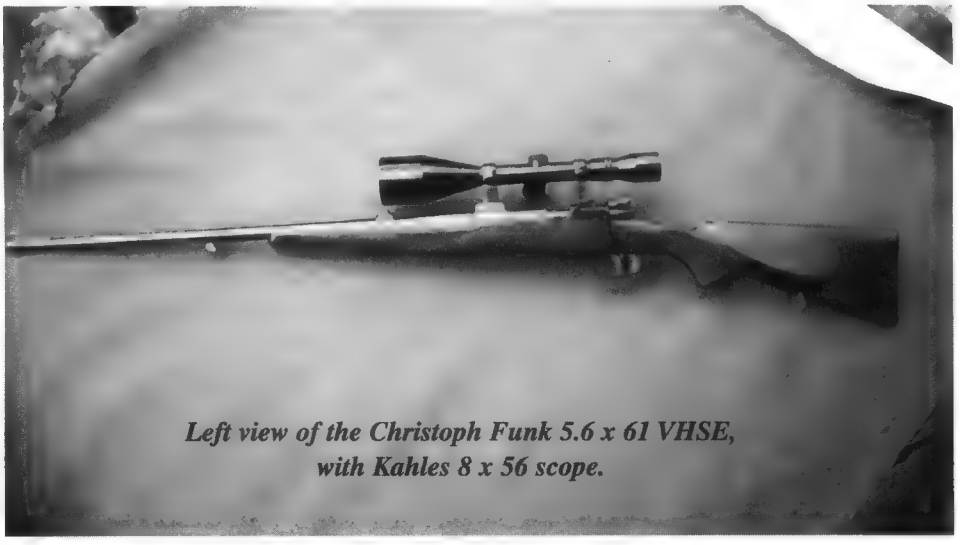

Left view of the Christoph Funk 5.6 x 61 VHSE, with Kahles 8 x 56 scope.

The 5.6 x 61 Vom Hofe Super Express

Continued

A year or so after buying my gun, a good friend thoroughly up-staged me by finding an original Vom Hofe-made rifle in this caliber, and we successfully formed cases for his gun in this manner. While but two examples do not prove a rule, still I think this case-forming procedure will work in most similarly chambered rifles. Still, If you can browbeat one of the Huntington boys or Dangerous Dave into importing some of the Gehmann brass, you won't be sorry.

Now that the brass problem was solved, the next order of business was locating suitable bullets. About the time I was doing this stuff, Speer saw fit to discontinue their 70 gr. .228" semi-spitzer, thus leaving the Hornady 70 gr. spire point as the only mass-produced American-made bullets suitable for the 5.6 x 61. As we shall see later, this was not altogether a bad situation. Of course 70 and 80 gr. bullets in the proper diameter are made by a few European companies, but then, as now, they are expensive, and very difficult to find. Thankfully, some of the smaller shops over here now offer .227" and .228" bullets. Since, other than a few wildcat rounds, the only other cartridge using this bullet diameter of which I am aware is the nearly-obsolete .22 Savage Hi-power, I can understand the reluctance of major component manufacturers to produce a bullet of such limited appeal. Oddly enough, the .22 Hi-power remains fairly popular in Europe, (where it is known as the 5.6 x 52R.) For reasons of availability, I limited my testing of the 5.6 x 61 VHSE to the 70 gr. bullets from Speer and Hornady.

Having secured the major reloading components, it was time to study the gun in more detail. From all appearances, it was sound and complete, and just looked like it wanted to shoot. Made in Suhl, Germany by Christoph Funk, its barrel is 25½" long, round, and of straight taper. There is a single standing rear sight, and a ramped front sight base, with a brass bead. There are also bases for a claw-mounted scope, which held the aforementioned low-power German scope of unknown lineage. The stock is considerably more "modern", than the somewhat more common Oberndorf Mauser sporters, in that it has a much straighter comb, with drop suitable for scope use. Very darkly stained, it is also very straight-grained, and has horn fittings—butt plate, pistol grip cap as well as the foreend tip. Checkering is very fine-22 or 24 l.p.i., but only of slight coverage, and in a simple point pattern. A lever releases the hinged floor plate, and there are redundant safeties—the normal military-type wing safety, as well as a Greener style side safety in the left side of the stock. Double-set triggers reside in a shotgun-type steel trigger guard. There is only the slightest bit of engraving on the blued receiver and the floor plate. In fact, the screw heads are more highly engraved than is the receiver! The receiver is the normal 98-pattern large ring, standard length military type (although there are no military proof marks present).

In short, all looked promising *except the scope.* It was old, low-powered and not very clear. Since the rings were soldered to the tube, it was not feasible to simply exchange scopes, utilizing the existing claw mount bases and rings. The only solution was to have new rings made. Here is where I really lucked out. A good friend is one of those rare people who can seemingly reduce all things mechanical to their lowest common denominator, and then duplicate almost any such beast. I've seen him craft a hydraulic box-folding machine from scratch, after having observed another such machine for mere minutes. Also, in a prior life, as he puts it, he was a gun smith. Therefore, I was knowingly and unabashedly lying, when I suggested that claw mount rings were totally beyond his ability to fabricate. Whether, he actually took the bait, or simply decided to do me (another, large) favor, I'm not completely sure. Regardless, in a couple of weeks, he had crafted me a set of rings—complete with windage adjustment—that fit the existing claw bases perfectly, and were high enough to use with a more powerful scope. I had mentioned to him that I did not anticipate any European or Asian hunts in the near future, and since I was sure that neither the Speer nor the Hornady bullets were designed for the velocities possible with the 5.6 x 61 VHSE—being intended for the rather doddering .22 Savage Hi-power—, I envisioned the gun more as a varmint rifle, with larger varmints, such as coyotes being the intended targets. He wisely realized that I would be using a more powerful scope, and further knew that I had a "spare" Kahles 8 x 56 scope lying around. Therefore, the rings were made to accommodate that scope; a decision I have never regreted. Thanks to his skills, I have a true dual-purpose rifle, complete with scopes suitable for each use. The Kahles has a double-dot reticle, and with the load I settled on, the bullet strikes dead on at 250 yards, with the lower dot, when the upper one is dead on at 100 yards.

At last, all systems were go, and I anxiously began loading and shooting. My first efforts were largely disappointing, producing low velocities and large groups with the Hornady 70 gr. bullet. I realized that I was still feeling my way with the cartridge, and hoped that as I approached normal maximum working pressures, accuracy would improve. Unfortunately, even though I achieved velocities in excess of 3700 f.p.s., with this bullet, the accuracy never improved. Groups of 2" or so were the best I could achieve. Since I've had good luck with this bullet in various .22 Savage Hi-powers, I have to conclude that it is simply not compatible with this gun. (I do not think that the much greater velocity than that obtained with the .22 Hi-power is the problem, for, as we shall see, the Hornady bullet has a thicker—or at least stronger—jacket

than does the 70 gr, Speer, which is quite accurate in the Funk Mauser.

About this time, good fortune struck again. A local gun shop found six boxes of "obsolete" Speer 70 gr. .228" bullets in the basement, and knowing my propensity for old, odd and obsolete components, asked me if I wanted them—cheap! After swallowing my Scottish tendencies, I agreed to their terms, without further haggling. Immediately, accuracy improved, with groups below 1" at 100 yards becoming the norm, rather than merely hoped for. However, Murphy's law finally made itself applicable to this project (I'd been wondering where old Murph had gotten to, since it is well known that he tries out all his laws first on reloading fanatics, before moving on to the general population.) It seems that whenever the Speer 70 gr. semi-spitzer exceeds about 3600 f.p.s., and depending upon atmospheric

Continued on page 43

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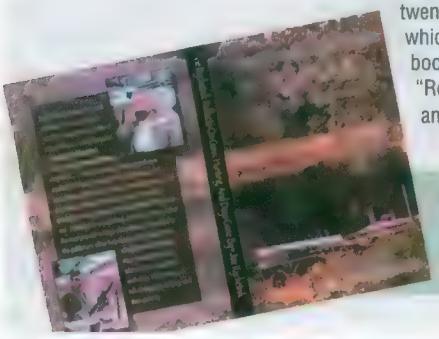
Frankly we have no one quite like Joe Rychetnik on our staff...if for no better reason than there are not that many raconteurs of this caliber in existence at any given point in time. If adaptability is the true test of aristocracy...then Joe must be incognito royalty. His articles are enjoyed for their face value by the man in the street...and the better educated pick up on the drollery, subtleties, innuendoes, and whatever other literary machinations that Joe feels like employing today.

Joe has quite a colorful background, and has authored two previous books on specific eras of his life...*Bush Cop* told the story of the early days of the Alaskan State Police, created when the former territory became a full state in January of 1959. It was kind of wild back then, and Joe found himself "the" (only) policeman for a district that extended from Barrow on the Arctic Ocean to Hooper Bay, south of the mouth of the Yukon, including all the coastal villages and the islands on the Bering Sea...a beat equal to covering the West Coast of the South 48 from the Canadian line to Mexico.

Then his second book, *Alaska's Sky Follies*, covered the period after he left the Alaskan State Police (still in one piece, surprisingly) and became the reporter-photographer-correspondent for *Time-Life News Service* and *United Press International*. When these employers decided they wanted "the facts" on some particular goings-on, frequently there was no way to get there except to hire a bush-pilot, head in the appropriate general direction, and keep your fingers crossed. This was an earlier era of aviation when breaking the rules was the rule, and when legends-to-be such as Don Sheldon flew the skies across the huge new state of Alaska. There are a number of photos of Joe with the bush pilots and their planes...mostly the planes are upside down on ice floes, lakesides, and heaven only knows what else. And Joe is a former Marine as well...to the extent that any Marine can become a "former Marine"...he survived the World War II battle of Okinawa, and was a Marine Combat Photographer during the Korean War. Somehow or other Joe missed the French Foreign Legion...but he was seemingly mixed up in just about everything else of excitement in the second half of the 20th Century. What a wealth of storytelling possibilities such a background would give to even an ordinary soul...but give that background to a gifted storyteller/yarn spinner such as Joe Rychetnik...and you can rest assured that the tales will flow...and flow...and hundreds of people will forget their problems of the day, and settle down to enjoy the latest yarn.

There are some 275+ pages in our assembly of Joe Rychetnik yarns...and the yarn count stands at thirty... twenty-five of which were previously published in *Precision Shooting* and *Tactical Shooter* magazines...and five of which appear here for the first time in print. The titles of a half dozen or so of his articles give clues as to the book's subject matters..."The Smell of Good Times Past"... "Walking With Old Friends"... "Good-Bye Roberts"... "Requiem for a Great Lightweight"... "Where The Old Shooters Meet"... "Bear With Me"... "Rawhide, Gun Leather and The Space Age"... "The Bush Cops".



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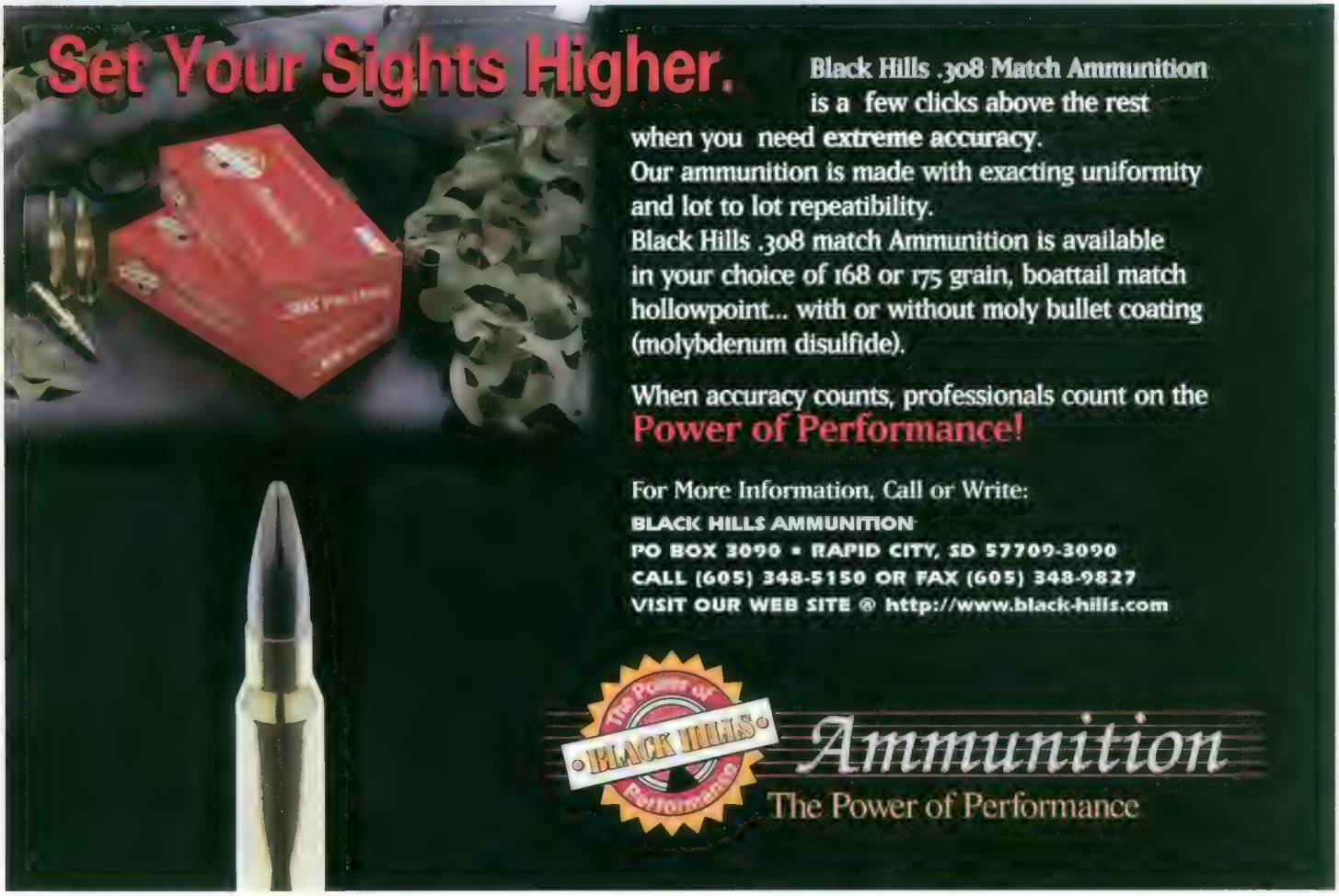
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The 5.6 x 61 Vom Hofe Super Express *Continued*

conditions, powder choice, etc., a few bullets fail to reach the target!! With Accurate 8700 powder, and 80-degree temperature, this occurred at 3616 f.p.s. (two out of four "blew up" before attaining the 100 yard target). However, using IMR 4350, and at 75 degrees, I successfully reached 3774 f.p.s. (with a 3/8" group), before any sign of bullet failure appeared. The load I finally settled on utilizes 53.5 grains of **old** H-450, for 3668 f.p.s., and consistent sub-1/2" groups. (I sure will be sorry when my last 1/2 lb. of that powder is gone!!)

Although I tried some Sierra 60 gr. .224" h.p. bullets, accuracy was flat out terrible. I really don't think any .224" bullets will produce acceptable accuracy.

Someday, if I can find enough of the Speer bullets to experiment with, I'd really like to try to better define some of the variables which may cause this phenomena. I wonder, for instance, whether certain powders leave a more abrasive residue in the bore, and this "scores" the bullet's jacket enough to start the break-up process. Do the different pressure/velocity curves produced by the different powders contribute? Does higher humidity, or higher barometric pressure cause the problem? Whatever the cause, it sure is disconcerting to have two or three shots touch at 100 yards, then the last two or so not reach the target. Until you observe the tell-tale puff of smoke or glint of unraveling jacket material down range, you really can question your sanity. (O.k., I do that regularly, anyway. And no, I don't particularly like the answers I get.)

Although I've heard of this phenomena happening fairly frequently, the only other time it happened to me was with a Swedish Mauser (of all things), and the Sierra 85 gr. h.p. That time, I was able to cause blow-up in a predictable manner. The barrel was a bit rough, and after three or four shots, enough jacket material was apparently able to build up on the rough spots to score the jackets of succeeding shots enough to weaken them to the point where the very quick twist of the 6.5 x 55 barrel (one turn in 7.8") produced enough rotational velocity that this, accompanied by fairly high linear velocity, caused the bullet to come "unglued". The rotational velocity, derived from the fairly quick 8.5" twist of the 5.6 x 61 VHSE may be one of the major contributing factors to causing bullet disintegration in my gun. Of course, the obvious contributing factor is the thin jacket of the Speer bullet—it was never designed to hold up to the velocities possible with this cartridge.

Whatever the cause, I'm quite content to have a 70 grain bullet exit the muzzle at almost 3700 f.p.s., and produce sub-1/2" groups 100 yards down range. As you would expect from

Continued on page 45

Now available...
The successor volume to "The Benchrest Primer".

THE HIGHPOWER SHOOTING PRIMER

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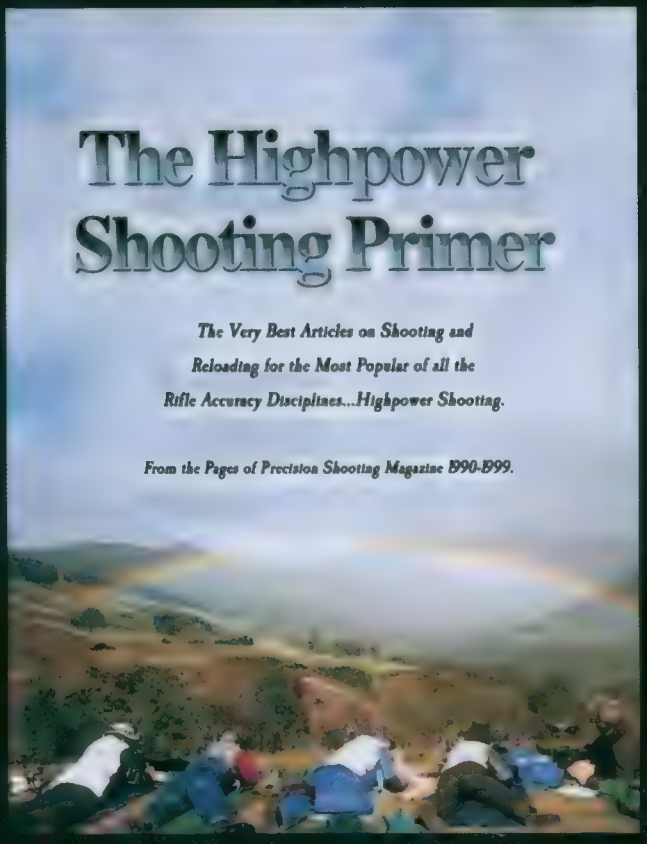
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3) Any one of the supermodels currently in vogue.
4) Firewood.
5) Food.

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Upon publication of *The Highpower Primer* it will be our intent to endow the NRA Competitions Division with a check in the $3,000-$3,500 range (Based on $1.00 per book, final figure being determined by the size of the press run). The monies are to be held in escrow by the NRA, and used for a suitable trophy and keepers for the proposed "The America Match", to be contested between Canada and the US every two years, with the first such match proposed to be held at the Connaught (Canada) range in 2002. Initial plans (subject to change) call for teams of 8 shooters, with a course of fire of 15 shots each at 300, 600, 900 and 1,000 yards.

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The 5.6 x 61 Vom Hofe Super Express

Continued from page 43

a bullet "on the edge", groundhogs do not remain in one piece when struck with one, even at distances of 350 yards. Still, I don't have my coyote load, unless I want to use the Hornady bullet, and settle for 2" groups. This would probably be acceptable for 200 and even 300-yard shots, but some how, the thought of going afield with a bolt-action varmint rifle only capable of 2-minute groups does not sit well. I guess I'd better try some of those expensive custom bullets, or even some of the European ones actually intended for this cartridge. Oh, how positively normal!!

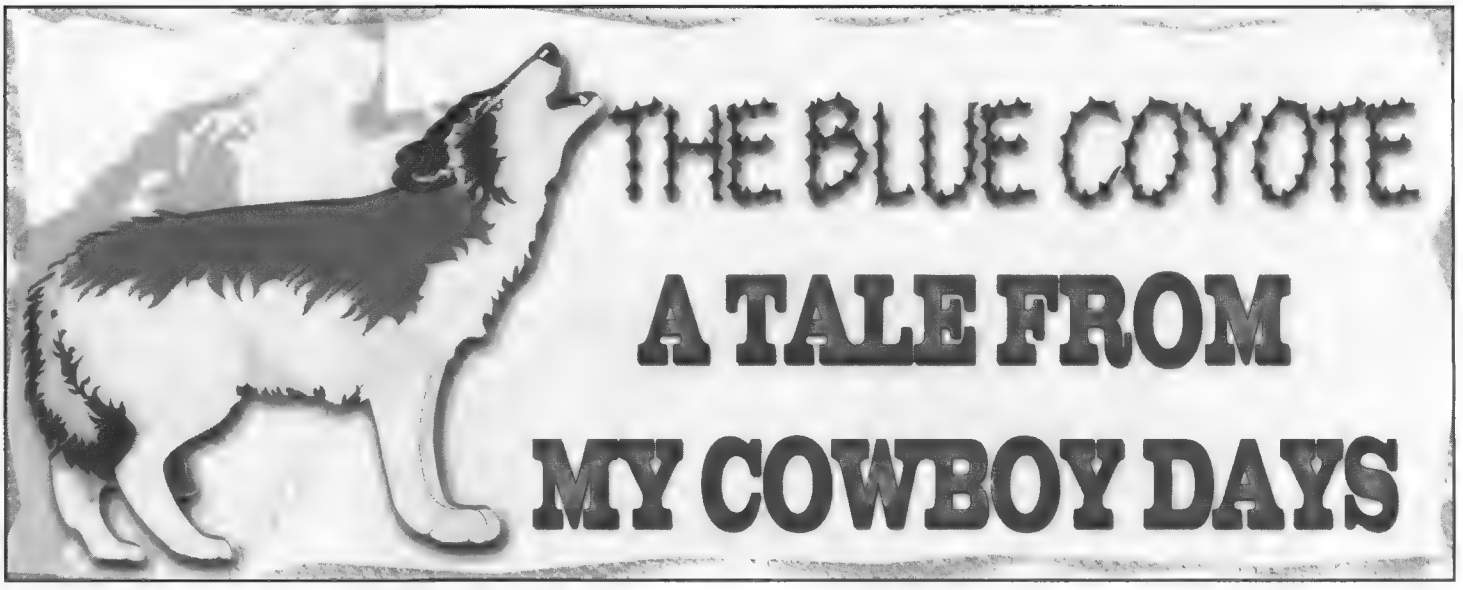
If you find yourself the fortunate owner of a rifle chambered for the 5.6 x 61 Vom Hofe, do not be intimidated. Once you find or make a supply of brass and ferret out some suitable bullets, loading is straight forward. As is to be expected for a cartridge with a high powder capacity-to-bore ratio, the slower-burning powders are called for. The various 4831's, and 4350's work fine, and I would expect Hodgdon H-1000 and Alliant Rl-25 to be excellent. Even Accurate 8700 was not too slow for this case. The R.C.B.S. dies worked as expected; that is to say flawlessly, and despite the long, sloping shoulder of this round, I did not experience undue case stretching. With a suitable 70 gr. bullet, velocities in the 3700 f.p.s. range should be expected, without excessive pressure. I used CCI 200 primers for all my testing, and had absolutely no problems. I used both the re-formed Norma 9.3 x 62 brass, and the Gehmann brass, and could detect no difference. All-in-all, my experiences with this gun and this cartridge were, for the most part, highly rewarding. Now, if I could only find a nice Kiplaufbusche in the rimmed version—. Oh yes, I already have the brass!!

(Note: The loads quoted herein were safe in the author's gun, on the day they were tested. Neither the writer nor the Publisher make any representation as to their safety in other guns. Reduce all loads quoted, and work back up cautiously.)

(Photos courtesy of Luke Munnell)

The only production cartridges known to the author which utilize .228" diameter bullets: center, the 5.6 x 61 VHSE, loaded with 70 gr. Hornady Spire Point, surrounded by .22 Savage Hi-Power (5.6 x 52R) cartridges. On the left is a round loaded for a model 99 Savage, with the 70 gr. Speer Semi-Point bullet, while the right cartridge is loaded with the Hornady 70 gr. Spire Point for a Mauser in this chambering.

Four boxes of .227"-.228" bullets. Clockwise, from 12 o'clock: Old Sisk 63 gr. Semi-Points; recently discontinued Speer 70 gr. Semi-Points; currently-available Hornady 70 gr. Spire Points and Ancient Speer 60 gr. H.P. bullets. Neither the first nor the last were tested in the 5.6 x 61, due to their scarcity and the fear that they would not hold up to the velocities generated by the Vom Hofe round.



THE BLUE COYOTE
A TALE FROM MY COWBOY DAYS

BY JACK RUSH

The October sun was hot, the sand hills shimmering in the last days of Indian Summer. We had just finished our usual Sunday duty, gathering live rattlers from a prairie dog town. We worked seven days a week on that ranch, and every Sunday morning we collected rattlers to be sold to a reptile exhibit in the Black Hills. The handlers in the exhibit used most of them as a source of antivenin, and part of the show was public viewing of the milking of the venom.

We had the snakes in a big wooden box in the back of the pickup, and had stopped to show the rancher's father our catch for the day. I was pretty jumpy, as I always was during and after one of these forays, as I hate snakes. My nerves were frazzled. I had to keep one eye on the open box of snakes and one eye on the darn Australian Blue Heeler dog that kept sneaking up on me from behind. Maybe he was a good stock dog, and the old man seemed to value him highly, but he had a reputation for trying to grab a snack from strangers legs. He was well acquainted with cowboy boots and, unlike the less well educated rattlers, he struck high from behind. I had learned to despise the treacherous beast, but as long as I could look the little coward in the eye, I was safe.

I had been hired on the son's ranch, about 20 dirt road miles away, (five rugged miles by horse) to watch over a hundred or more head of buffalo. My main objective was to keep the herd somewhere between the Mexican and Canadian borders. Buffalo had no interest in boundaries and no respect for fences. Also they were wild, fickle, and often mean as hell. The boss, a buffalo historian and one rough and brave cowboy, had told me that nobody who had ever made a pet of a buffalo ever died a natural death, unless you considered being turned into a grease spot to be natural.

I had become a pretty good buffalo hand, and could make them do anything they wanted to do.

But, back to the story. The weekly rattlesnake roundup was considered by the boss to be recreation. I viewed it as a preview of hell. As a hired hand, my opinion was not solicited.

I was glad when we headed back to the home ranch, though the unpleasant task of transferring the rattlers to a large electric cooler remained. At least I would be facing attack from only one direction. I would have the remainder of the day to loaf around my sod shack. I was laying plans for a visit by myself to the dog town later in the week.

Prairie dog shooting was my favorite ranch recreation. I used an FN Supreme Mauser in 243 caliber. It was wearing its third barrel, a Douglas Premium sporter, and was topped with a Redfield 10X scope. I had begun to scrape the bottom of a 50 lb. keg of salvage 4831 powder, which kind of explains three barrels. I carefully scoped every mound for the telltale lump that would be a rattler sunning himself. This close to cold weather was denning time for them and they were concentrated in the den areas, basking in the last warmth of the season. Every one I picked off with the rifle was one I wouldn't have to face on Sunday. My boss did not approve of this sort of thing, as snakes represented beer money in his pocket and he was a rather accomplished drinker, as were most of the cowmen in that area. One could think of my rattler shooting as being somewhat therapeutic for both of us. What he didn't know didn't hurt him and he was happy to have me thin out the prairie dog population a little.

Everybody was well armed on that ranch, but I suppose I was considered a bit odd because I shot so much and tended to be a perfectionist regarding accuracy. Even the pistol I wore was a professionally tuned Smith .357. The beef cowboy always had a single action 44 slung on his hip and a 45/70 in his saddle scabbard. He didn't care much for the buffalo, and was well aware that a one ton buffalo bull could outrun his best horse.

I lived in a sod house topped by a few tiers of logs to make room for a sleeping loft. Soddies are not noted for varmint proof walls, and one sleeps a bit less fitfully in a loft eight feet above the dirt floor. Many were the early prairie mothers who froze in terror when they heard the dreaded rattle from under the

kitchen range.

My soddy was located quite far from the main ranch, in the middle of a large buffalo pasture. I found the grunting and pawing of the buffalo around my walls comforting, as the buffalo left no snake untrod. Either the fangs did not penetrate the wool above the hooves or they were immune to the venom. In any case, they hated the rattlers as much as I did and I never encountered one in their pastures.

Other wildlife abounded in and around my walls. When I retired at night I left a kerosine lamp burning very low, in case I had to get up in the night. In the dim light I would often watch a deer mouse trying to reach the grease in my frying pan. He would come out of the sod wall onto a table, jump to the water reservoir of the wood fired kitchen range, and approach the iron frying pan across the long flat cooking surface. As he progressed closer to the fire box he would begin to dance and then retreat to the table. As the fire burned lower and the surface began to cool he would progress farther with each try, ending in a comical dance and retreat. I was always asleep by the time he made it, but his little tracks were in the grease in the morning.

Music of migrating sand hill cranes filled the air for weeks. Grouse were abundant, and the ubiquitous coyotes sang me to sleep from the hills near my cabin every night. Unless you like a lot of trees, it was pretty much paradise.

We lost an occasional beef or buffalo calf in the natural course of things. The coyotes, scavengers they are, would come in and slick up the carcasses at night. Having trapped professionally in years past, I could not resist a few sets along my routine rounds of fences and windmills. The focal points of my trapping were near the carcasses, as they remained points of interest to the coyotes for some time after the feast was gone. I used mostly dirt hole bait sets and flat scent sets. I tried to avoid catching eagles and skunks for fairly obvious reasons. Since we were not sheepmen we had no problem with the eagles. Coyotes could take a live beef calf. Nothing messed around with a buffalo mama.

I was quite tickled with myself one morning when I took a big old three toed coyote. Fooling a smart old once pinched coyote is about the ultimate trappers achievement.

As fall progressed and the nights became frosty I noticed the coyotes were becoming bolder, the chorus closer to the soddy.

I was always accompanied by Kermit, the ranch cow dog. He was a border collie, one brown and one blue eye. While an excellent and brave stock dog, he was also playful as a puppy. He had been trained at the command "ATTACK", to turn and savagely attack the pant leg of the one who gave the command. Our favorite trick was to brag up Kermit's bravery and encourage visiting hunters to order Kermit to attack a buffalo. We were careful not to play this trick when the hunter was armed, as we loved Kermit, and he never really hurt anybody. Cowboys love practical jokes of all sorts.

One thing that Kermit would not do was enter my soddy. Not even the tastiest morsel would induce Kermit to step over my threshold. I figured he knew something about the inside of my house that I didn't, tending to make me a little cautious.

Instead of coming in, he slept against my outside door every night. One cold and frosty full moon night I heard the coyotes singing very near the cabin. I knew that Kermit would not tolerate this intrusion and would fiercely defend his territory, perhaps with fatal results for himself. He was outweighed by most coyotes and would have no chance against the pack.

Each night when I crawled into the bedroll in the loft, I would leave all my clothes beside the bedroll and pull them in for a bit of warming before dressing under the covers for the day. I mention this to explain that I was not prepared for quick exits from bed.

It was well into the night when the coyotes moved in. I had to save Kermit and had no time to dress. I flung myself down the ladder, grabbed a lever action Marlin beside the door and stepped out into the frosty night, totally in the buff.

The scene was well lit by the full moon reflecting on the frost. I could see the line of coyotes advancing, now only about a hundred yards from the cabin. Kermit was approaching the leader in a crouched, fighting stance. I threw the rifle to my shoulder and fired a quick but well aimed shot at the skull of the leader. He let out a yelp and fell to the ground. The others made a hasty retreat for the hills and I made a very hasty retreat up the ladder to my warm bed. I expected to collect a nice pelt in the morning. The rest of the night was quiet.

In the morning I dressed hurriedly and stepped out into the bright warm sun, skinning knife in hand. To my surprise I found no sign of the marauder. The short cropped buffalo pasture could hide nothing. I decided I only grazed the beast.

Though I did most of my own cooking in the soddy, I occasionally had meals at the main house with the ranch family. I decided that the previous nights adventure would make amusing talk at the breakfast table so I headed to the main house.

As soon as we sat down for pancakes, and before I could begin my tale, the boss said that his dad had called. It seems that he had found the Blue Heeler on the porch with a terrible gash in his head, probably, he thought, inflicted by a coyote. It was so bad he might not live. The old man held that varmint in high esteem. I kept my mouth shut except to stuff it with pancake. I knew immediately that that mean critter had formed an unholy and rare dog/coyote alliance. Had the bullet been a quarter of an inch lower it would have been a classic case of "shoot, shovel and shut up". But the blue coyote lived to bite another day.

I knew his secret night life, and our relationship continued to deteriorate. Neither of us ever gave the other a chance for revenge. I take some comfort after these many years in knowing that time was on my side.

Secrets For LOADING The Old Ones

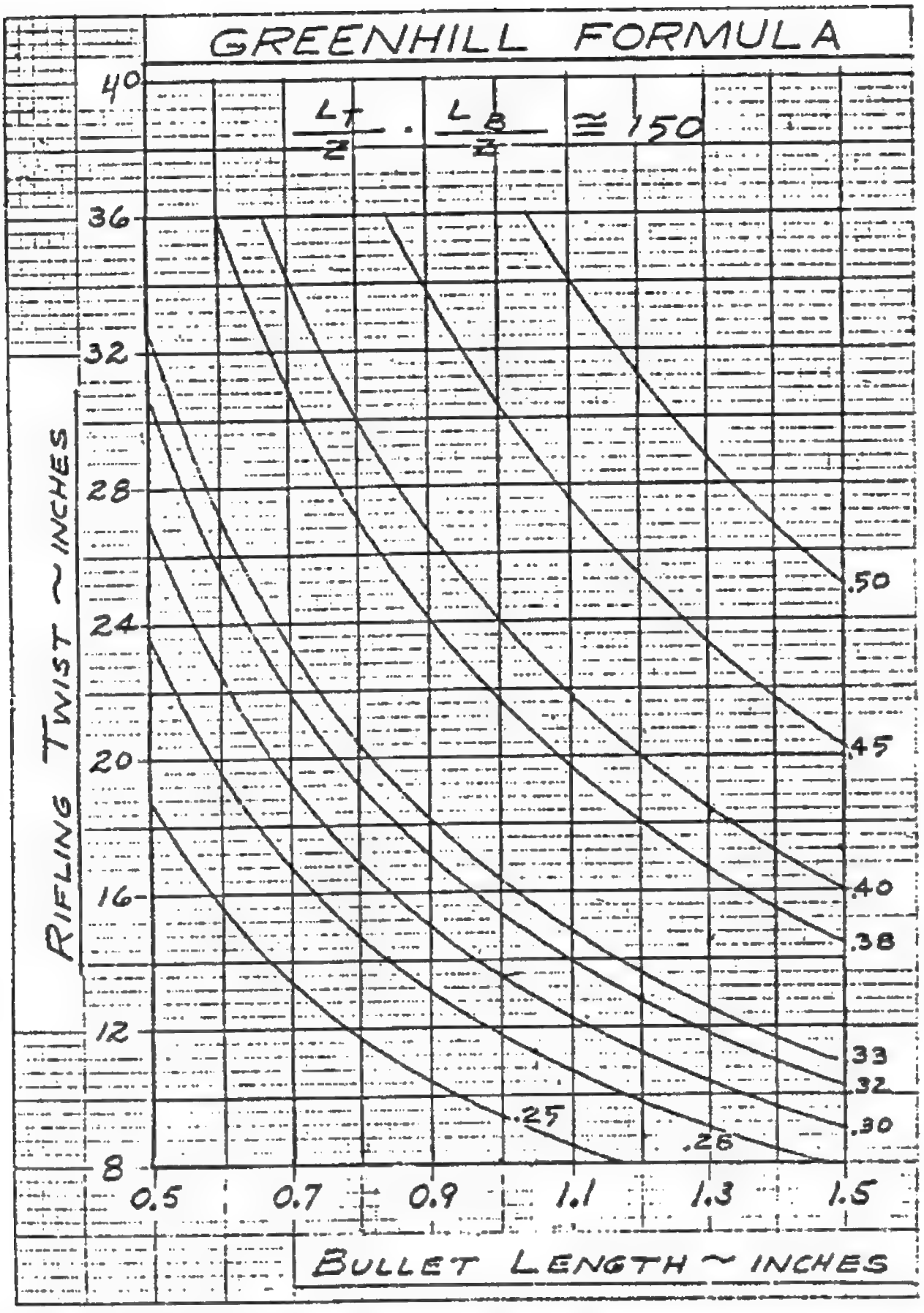
Part 2

BY JOHN CAMPBELL

Bullets & Twists For Classic Cartridges.

Cartridge	Factory Bullet Weight	Factory Twist Rate
.22 WCF	45 gr.	1-20
.25-20 WCF	86 gr.	1-12
.25-21 Stevens	86 gr.	1-14
.28-30 Stevens	135 gr.	1-14
.32-20 WCF	115 gr.	1-20
.32 Ideal	150 gr.	1-18
.32-40	165 gr.	1-16
.35 WCF	250 gr.	1-12
.38 Long CF	150 gr.	1-36
.38-40 WCF	180 gr.	1-36
.38-55	255 gr.	1-18
.38-56 WCF	255 gr.	1-20
.38-70 WCF	255 gr.	1-24
.38-72 WCF	275 gr.	1-22
.38-90 Win. Exp.	217 gr.	1-26
.40-50 Sharps St.	260 gr.	1-18
.40-60 Marlin	260 gr.	1-20
.40-60 WCF	210 gr.	1-40
.40-65 WCF	260 gr.	1-20
.40-70 Sharps St.	330 gr	1-20
.40-70 WCF	330 gr.	1-20
.40-70 Ballard	330 gr.	1-20
.40-72 WCF	300 gr.	1-22
.40-82 WCF	260 gr.	1-28
.40-90 Ballard	370 gr.	1-18
.40-90 Sharps St.	370 gr.	1-18
.40-110 Win. Exp.	260 gr.	1-28
.405 WCF	300 gr.	1-14
.43 Spanish	370 gr.	1-20
.44 WCF	200 gr.	1-36
.45-60 WCF	300 gr.	1-20
.45-70 Govt.	500 gr	1-22
.45-75 WCF	350 gr.	1-20
.45 Sharps 2 4/10	400 gr.	1-18
.45 Sharps 2 6/10	485 gr.	1-18
.45 Sharps 2 7/8	485 gr.	1-18
.45 Sharps 3 1/4	500 gr.	1-18
.45-90 WCF	300 gr.	1-32
.45-125 WCF	300 gr.	1-36
.50-70 Govt.	450 gr.	1-60
.50-95 WCF	300 gr.	1-60
.50-110 WCF	300 gr.	1-54
.50-115 Bullard	290 gr.	1-72

NOTE: These cartridges represent those most likely to be encountered. For an exhaustive list of all 19th century cartridges, their twist rates and more, consult *Cartridges of The World,* currently edited by M. L. McPherson.



I've published this chart before, but it bears more exposure because it provides a handy means of determining the best type of bullet for loading your old cartridge. First find the twist rate of your barrel, then use this graph to find the longest bullet that it will stabilize.

Continued on next page

Cast Bullet Loads For Classic Cartridges.

.22 WC

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 228151	45 grs.	Win.	4759	6 grs.	CCI 400	1435
			4227	5 grs.	CCI 400	1425
Lyman 22636	46 grs.	R-P	4227	7 grs.	CCI 400	1453

.25-21 Stevens

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 257464	86 grs.	Bertram	AA-9	5.5 grs.	CCI 450	1267
			4227	7.5 grs.	CCI 400	1418
Lyman 257283	87 grs.	Bertram	AA-9	6 grs.	CCI 400	1396
			7625	3.5 grs.	CCI 400	1191
			4227	8 grs.	CCI 400	1488

.28-30 Stevens

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 285202	120 grs.	Bertram	Unique	7 grs.	CCI 200	1250
			4759	7 grs.	CCI 200	1200
Lyman 285221	135 grs.	Bertram	4198	14 grs.	CCI 200	1350
			4227	13 grs.	WLR	1328
Lyman 287346	135 grs.	Bertram	Green Dot	9 grs.	CCI 200	1425

.32 Ideal

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 32359	115 grs.	Bertram	Unique	4.5 grs.	CCI 400	1280
	150 grs.	Bertram	2400	10 grs.	CCI 400	1364
Lyman 323470	165 grs.	Bertram	5744	11 grs.	CCI 400	1218

.32-30 Remington Hepburn

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 31326	98 grs.	R-P	4227	6.5 grs.	CCI 400	1282
Lyman 31356	125 grs.	R-P	4759	8 grs.	CCI 400	1325
Lyman 31114	125 grs.	R-P	4759	7 grs.	CCI 400	1223
			4227	8 grs.	CCI 400	1278

.32-40 Marlin & Ballard

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 319247	160 grs.	W-W	4227	10.5 grs.	CCI 200	1248
Lyman 323470	160 grs.	W-W	4227	11 grs.	CCI 200	1195
SAECO Style A	183 grs.	W-W	RL-7	13 gs.	CCI 200	1207
Lyman 321232	180 grs.	W-W	4759	13 grs.	CCI 200	1410
			5744	13 gr s.	CCI 200	1319
Lyman 321297	185 grs.	W-W	5744	13 grs.	WLR	1281
Lyman 319289	185 grs.	W-W	5744	13 grs.	CCI 200	1275
			4227	13 grs.	CCI 200	1352

38-55 Winchester & Ballard

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 375248	255 grs.	W-W	4198	17 grs.	CCI 200	1248
Lyman 375272	350 grs.	W-W	5744	17 grs.	WLR	1223

.38-70 WCF

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 375167	270 grs.	Bertram	5744	19 grs.	WLR	1283
			4227	17 grs.	WLR	1288
Lyman 375449	272 grs.		4227	19 grs.	WLR	1387
			5744	20 grs.	WLR	1316

.38-72 WCF

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 375167	270 grs.	Bertram	5744	20 grs.	WLR	1326
			4198	24 grs.	CCI 200	1223

.38-90 Win. Express

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 37584	220 grs.	Bertram	4198	20 grs.	WLR	1283

.40-50 Sharps Straight

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Old West 407-250	250 grs.	W-W	4759	19 grs.	CCI 200	1284
Rapine 413300	300 grs.	W-W	4198	18 grs.	CCI 200	1235
	300 grs.	W-W	5744	19 grs.	CCI 200	1225
RCBS 41-300 CSA	300 grs.	W-W	AA-9	15 grs.	CCI 250	1182
	300 grs.	W-W	5744	19 grs.	CCI 200	1215

.40-60 WCF

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 410459	215 grs.	R-P	4227	19 grs.	CCI 200	1529
			RL-7	22 grs.	CCI 200	1370
Old West 411-230	230 grs.	R-P	Grn. Dot	10 grs.	CCI 200	1332
			4227	21 grs.	CCI 200	1577
			4759	22 grs.	CCI 200	1672

.40-65 WCF

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Rapine 413300	300 grs.	W-W	5744	21 grs.	WLR	1278
RCBS 41-350	350 grs.	R-P	4227	20 grs.	CCI 200	1295

.40-70 Sharps Straight

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Old West 407-250	250 grs.	Bertram	4759	19 grs.	CCI 200	1284
Rapine 413300	300 grs.	Bertram	4198	18 grs.	CCI 200	1135
			RL-7	23 grs	CCI 200	1295
			5744	19 grs.	WLR	1166
RCBS 41-300	300 grs.	W-W	5744	19 grs.	WLR	1215
			RL-7	22 grs.	WLR	1225
			Unique	15 grs.	WLR	1343
RCBS 41-350	350 grs.	Bertram	RL-7	22 grs.	CCI 200	1284
			4227	21 grs.	CCI 200	1365

Continued on next page

Secrets For Loading The Old Ones — Part 2 *Continued*

.40-90 Sharps Straight

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Old West 407-250	250 grs.	Bertram	RL-7	27 grs.	CCI 200	1364
			Grn. Dot	12 grs.	CCI 200	1201
Rapine 413300	300 grs.	Bertram	4198	25 grs.	CCI 200	1325
			RL-7	27 grs.	CCI 200	1322
			3031	36 grs.	CCI 200	1411
RCBS 41-350-FN	350 grs.	Bertram	4198	26 grs.	CCI 200	1328
			AA-9	19 grs.	CCI 200	1244
RCBS 41-400 FN	400 grs.	Bertram	4198	28 grs.	CCI 200	1346
			3031	36 grs.	CCI 200	1376

.43 Spanish Remington

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 439186 (new)	370 grs.	Bertram	4759	26 grs.	CCI 200	1375
			4227	20 grs.	CCI 200	1365
			5744	21 grs.	CCI 200	1333
Lyman 439186 (orig.)	387 grs.	Bertram	4198	24 grs.	CCI 200	1275
			3031	32 grs.	CCI 200	1258
Lyman 446410	400 grs.	Bertram	RL-7	20 grs.	CCI 200	1254

.45-60 WCF

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 456191	300 grs.	R-P	4198	20 grs.	WLR	1221

.45-75 WCF

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 456192	350 grs.	W-W	4198	21 grs.	CCI 200	1209

.45-90 WCF

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
SAECO 458-308	308 grs.	Bertram	5744	28 grs.	CCI 200	1408
Rapine 460350	350 grs.	Bertram	4227	25 grs.	CCI 200	1377

.45-120 Sharps Straight

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Rapine 460-350	350 grs.	Bertram	RL-7	35 grs.	CCI 200	1229
Lyman 457124	385 grs.	Bertram	RL-7	33 grs.	CCI 250	1358
Lyman 457193	400 grs.	Bertram	4198	32 grs.	CCI 200	1440
Lyman 457121	450 grs.	Bertram	4759	28 grs.	CCI 200	1380
Lyman 457406	485 grs.	Bertram	4198	26 grs.	CCI 200	1360
Lyman 457235	500 grs.	Bertram	3031	40 grs.	CCI 200	1408

.50-70 Govt.

Bullet	Weight	Case	Powder	Charge	Primer	Velocity
Lyman 518145	350 grs.	Dixie	3031	32 grs.	WLR	1197
Lyman 515141	450 grs.	Dixie	3031	28 grs.	WLR	1222

NOTE: These loads were safe in the rifles tested. Cut powder charge at least two grains and work up in half-grain increments for your rifle. If you change any component, do likewise. All loads assembled with approximately 1 gr. of PURE cotton filler inserted above the powder charge. All bullets were seated to touch the rifling. Velocities taken 6 feet from the muzzle with an Oehler 33 chronograph. The author and this publication assume no responsibility for the use of this data.

BIPODS

A Sniper's Curse

An Opinion Piece

BY NORM & ROCKY CHANDLER

So, you have one on your sniper rifle, right? Too bad—but you are not alone. All United States Army Snipers and almost every military or police sniper in Europe has a bipod hung from his rifle. At a recent Black Water sniper course, nine out of fourteen students had and used bipods. Too bad for them, as well.

We can visualize the outthrust jaws and lower lips. *"If all of those organizations like bipods, how can anyone claim bipods are a negative?"*

Ask the United States Marine Corps. They do not use sniper rifle bipods. You could have asked Master-Sniper, Gunnery Sergeant Carlos Hathcock. He thought bipods on sniper rifles an abomination. So does the Corps' current Master-Sniper, Master Sergeant Neil Morris. These authors agree.

Our earliest personal bipod experiences go back to World War II when Browning automatic rifles came with bipods. Yet, examine old war photographs and, except in training films, you will note the lack of bipods on most BARS. BAR men dumped their bipods at first opportunity. The Korean War monument in Washington DC even includes a soldier armed with a bipodless BAR. Although a Browning is not exactly a sniper weapon, we should wonder why soldiers and marines of those times trashed their bipods if the device was useful in war—especially for rifles like the BAR weighing 20 or so pounds?

That answer is as true today. A bipod is a practical device for rifle ranges and for shooting off benches at long distances, but sniper rifles should not wear them. For sniping, a bipod is far more problematical than useful. Consider the following.

In field use, the bipod is rarely the right height. A sniper cannot get really low using a bipod, and conversely, ordinary fields and meadows usually require at least a sitting position height to see anything—which makes a conventional bipod unusable.

Charles Henderson, author of *Silent Warrior* (a third book about Marine Sniper Carlos Hathcock) writes that in training Vietnam snipers, *"A critical part of Hathcock's shooting fundamentals involved a marksman's thorough familiarity with his rifle and his ability to adopt the various firing positions to accommodate his body and still provide himself a solid platform"* (pg. 60). The unfortunate fact is, a sniper will only rarely be able to enjoy the convenience of a bipod. The rest of the time he is bent, scrunched, hunched, stretched or a dozen similar descriptions attempting to stay undiscovered and still get on target.

"'Most of the time when you take a shot at an enemy, he ain't gonna stand still for you.'" Henderson quotes Carlos. *"'So you have to get used to moving those crosshairs with the target, and still keeping good trigger control and a solid position'"* (*Silent Warrior,* pg. 61). A bipod is particularly ineffective on moving targets; something has to swing to follow a target. What do you do—lift your bipod and replant it? Hunch across the ground? Unlikely. No one would recommend such techniques. In shorter-range training, some schools teach and encourage student-snipers equipped with bipods to adopt an "ambush" technique on moving targets. In this case, "ambush" means picking a spot and holding there until the target comes into the reticle—if he ever does. Snipers without bipods do not suffer that restriction.

Have you tried to crawl through honeysuckle even with your bipod folded? Highly impractical. Imagine attempting to move swiftly and silently with the thing extended. Imagine trying to "break away" without time to fold the bipod. Imagine shifting about within your concealment trying not to knock against, snag your bipod, or move vegetation. Not too practical!

During a recent urban exercise, teams were required to move up and down stairs. We repeatedly saw snipers with opened bipods snag their weapons on the same banister. We could include endless stories of bipod hang-ups, but will add only one we particularly like. During a recent maneuver, a sniper dropping into

Continued on next page

Bipods — A Sniper's Curse

Continued

position thumped a bipod foot onto his partner's hand.

An often ignored detail is that although a sniper only rarely gains a position where his bipod is the correct height, the sniper is likely to search for such a convenience. The point here is that the presence of a bipod can too often determine where the sniper sets up. In other words, rather than choosing the best tactical position, the sniper selects the best bipod position. That is the tail-wagging-the-dog. It should not happen, but the condition is often observed.

An example of really bad bipod placement is common in urban fighting with careless snipers (both military and police) using convenient window sills for bipod rests. We all know better, and most will quickly agree that a rifle barrel should never protrude from a window or above a roof line, but a bipod makes such placements tempting. It is demonstrable that if a sniper has a bipod, he will attempt to use it.

Accuracy is, of course, paramount within all sniper related activities. We struggle to equip snipers with the most accurate rifles obtainable, and we teach and insist on superior techniques that allow a sniper to use best his accurate rifle's capabilities. We point out that a basic tenet of marksmanship is to avoid placing your rifle on a hard surface. Experts like to recommend getting a hand or something soft between the stock and the limb or rock because your weapon will perform differently from a hard surface. Good policy, but what could be harder than a bipod?

On what then, do we rest our rifles for those long and imaginative shots—that are more dreamt about than actually encountered?

A sniper is taught, or should be taught to use everything the terrain offers—for concealment, for cover, and for support. During the early 1950s, a simpler time when everyone was required to wear his steel helmet, we even taught a supported prone with the sniper's forward hand resting on his carefully placed helmet and the rifle resting in his hand.

The Marine Corps and many law enforcement snipers use their packs. A pack is hard to beat. It can be shaped, and it is soft. A pack can be whipped on or off in moments, and what is in a combat pack should be on hand, anyway. We know of few pack shooters who have gone to bipods, but we are aware of a host of former bipod snipers who have graduated to packs. They choose packs because experience has demonstrated better accuracy and broader in-the-field application.

We take note that police snipers are often shown deployed without a pack. Such deployments should be rare. Law enforcement snipers are exposed to overly long emplacements without relief. They need liquids, perhaps some food, and . . . well, articles within a sniper's pack can be useful.

Hathcock and many of the Vietnam era scout-snipers went into the field carrying everything on their belts or in their pockets. They shot from whatever support could be found, but Carlos recommended pack support, and his guidance was instrumental in adoption of the Marine Corps' current pack-shooting techniques.

Our favorite World War II sniper, Sniper-Sergeant Harry Furness mentions having a small monopod made in England and shipped to him on the line. The device saw little service, however, as Sergeant Furness rarely discovered the spot that was the right height, even when he could dare the gross movements of planting even that single stake.

Have you ever looked across a firing range and noticed all of the bipod guys up on their knees adjusting bipods? The identical contortions, exposures, and delays occur in the field. If there is even the remotest possibility of an enemy marksman or observer, you simply cannot have extraneous movement.

In the field, bipod use can induce canted shooting. How often, after all, is the earth exactly horizontal? Very rarely. But, do we adjust bipod leg-lengths to compensate? Note sniper Furness's avoidance of even tiny movements. Or do we—perhaps unknowingly—fire with our rifles canted? And if we do adjust one leg, will we in our haste and combat tension fail to return the leg to proper length and discover in the next moment of truth that the legs do not fit the new position? To avoid canting, could we equip with the latest gimmicky bipod that has a swiveling head? Now there is a real "flopper-arounder" to lug into the field.

We should recognize that the less you have to deal with in the heat of fighting or the stresses of making the perfect shot, the better you will perform. Everyone has heard of buck fever while hunting. In combat, the condition is worsened a thousandfold. IQs are not high during combat, and it is quicker, safer, and more effective to slip a light pack and use it for a rest.

We add the note that in packs, we are not speaking of the preposterous loads of gear our troops lug around these days. No legitimate sniper would be caught with such a gross burden. Those are not combat packs, they are mule-loadings that should have been left behind. When discussing sniper weaponry, we are rarely complainers of excess weight, but lugging a bipod does add pounds, and as the thing is useless, it should be eliminated.

It is always fair, however, to list positive aspects of the item we criticize. Our observation has been that some snipers carry bipods to avoid laying their rifles in dirt or on poor surfaces *during rifle range training*. SWAT Commander, sniper, and sniper instructor Captain Jim Reifinger uses that technique, but he and the others unfailingly remove their bipods for actual operations. They do not shoot off a bipod.

We can therefore concede that on a range, a bipod is probably an acceptable substitute for a ground cloth. Bipods are also cool looking, and, hey, lots of guys have them. Otherwise, we have nothing supportive to add.

A wildcat Swift, The Ultimate "Golden Age" Varmint Rifle

Jerry Swinney's Second Memo for the Rifled Arms Historical Association

When I decided to build a new and more specialized woodchuck rifle about 1951 I had a good deal of experience behind me.

I had been allowed my first rifle (a .22 LR Savage 23 AA with a Lyman 422 "Expert" telescope) by my parents on my 16th birthday in 1935. We had a summer place on the west side of Otsego Lake, 6 miles from Cooperstown, and I was shortly walking the pastures to the west on every clement evening looking for woodchucks.

By 1936 I had realized that I was undergunned and with my father's financial help I bought a Winchester 54 National Match in .22 Hornet caliber. (The National Match grade was briefly cataloged in all Model 54 calibers instead of only .30-06.) A year or so later it had a 3/4" Fecker target telescope in 4.5 power. This was an improvement over the .22 LR; it would reach out 150 yards, and by judicious overholding, almost 200. (The measure of the times is that I found a local handloader who would load ammunition for me for two cents a round; I furnishing empty cases and he furnishing everything else — a dollar for a box of 50 cartridges! Factory loads were $1.50 a box.)

By the summer of 1941 I was very friendly with the well-known riflemaker M. S. Risley, then of North Brookfield, N.Y., and I traded the Hornet with him for a Winchester Single Shot in .22-3000-2R caliber, a wildcat that he had originated. [Note: Mr. Swinney knows very well that there are claims that Risley did no more than make the first reamer for the 2-R, but he believes otherwise. RJG] Loaded with 17 grains of 4198, manufactured in those days by DuPont, it would drive a 50 grain bullet at better than 3000 feet per second, and until the coming of the .222 Remington, a similar but rimless cartridge that was suitable for bolt action rifles, the 2R was very popular among serious shooters. From Winchester I was still able to buy the parts for Schuetzen double set triggers. (I got the last long loop

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Pictured above is H.J. Swinney's "big Swift," the building of which is described in this article. The Swift is not a match rifle, of course, but its display with Jerry Swinney's shooting jacket is appropriate. He used the rifle in specialized matches at Long Island's Roslyn Rifle and Revolver Club during the early 1950's. The unusual three diameter telescope is by Arthur Hubalek, the well-known Brooklyn gunsmith, who also rifled the barrel. Photo by Geoffrey Gross

A Wildcat Swift, The Ultimate "Golden Age" Varmint Rifle *Continued*

lever they had; I had ordered a spur lever but they had no more) I also sent my telescope back to Fecker to be converted to 1-1/8" in 8 power. I made a beavertail forend and inletted a high cheekpiece into the stock and fitted a shooting gunsling. This rifle, with its Diller relined barrel (originally .32-40), 30 inches long and in #3 weight, would really shoot better than I could hold it. With carefully loaded ammunition and on a calm day it would reliably deliver inch groups at 100 yards. But even its improved ballistics were not enough.

By the end of the war and military service, I had set up a household in Brooklyn and had joined the Roslyn Rifle and Revolver club, which had a 200-yard outdoor range. I was regularly shooting in military rifle competition and from some of the hard-boiled old timers at Roslyn I gradually learned things about hard holding that I hadn't known upstate, where most target shooting was done from a bench. A number of the serious Roslyn shooters were woodchuck hunters too, driving north to Columbia and Dutchess Counties for Saturday afternoons, and successfully taking shots to 300 or more yards with heavy super-accurate rifles. My 2R was outclassed in such shooting — and the rolling farmlands of Otsego and Madison Counties, where I still often hunted offered plenty of these long shots too. I needed more power.

I was regularly attending the bench rest matches in Johnstown, where there was a good deal of talk about the .219 Donaldson Wasp caliber. I was also stocking rifles on a moonlighting basis in Brooklyn, and was closely friendly with Harlan G. Howe and Norman Joseph, both expert machinists and gunsmiths, though they earned their living otherwise. Thus I decided on a .219 Wasp, and Harlan Howe and I determined to build a Single Shot Winchester that would prove that it was possible to make one shoot as well as a bolt action rifle.

I acquired an action, which Harlan Howe modified to take a heavy stock bolt and to allow a close pistol grip. (Since it was a flat spring action and we wanted to avoid cuts in the barrel, the action was converted to use a coil mainspring and, for other reasons, a coil sear spring.) M. S. Risley fitted the barrel and bushed and vented the breechblock, and made a new tool steel link that produced minimum sloppiness in the breechblock movement and Harlan Howe chambered the barrel for .219 Wasp. I made a carefully-fitted target stock and forearm, and indeed the rifle shot very well for a single shot, producing 100 yard groups a little under one inch.

But I found cases a pest to make, with a high rate of loss during forming. Furthermore, I did not think I was getting exterior ballistics — trajectory and so on — comparable with a .22-250 (then a wildcat caliber) or a .220 Swift, though that was how the Wasp was touted. So I decided on another try.

In the meantime, Arthur Hubalek, the well-known Brooklyn marksman, gunsmith, and barrel maker had died. Harlan Howe and I found two barrel blanks in his shop that were .224" and hard steel. (Almost all his production was .222", made of mild steel for .22 LR caliber) I acquired a Yugoslav Mauser receiver and bolt of peacetime quality (I had a terrible time finding a magazine for it, which is not the same as a standard 98 Mauser), and Norman Joseph ground a reamer for a blown-out and sharp shouldered version of the .220 Swift case. It was very close to a Kilbourn Swift or a .220 Weatherby Rocket.

The idea was to produce a cartridge that would drive the heaviest possible .224" bullet (at that time the Sierra 63 grain semi-spitzer) at the highest possible velocity, in order to produce a flat trajectory from, say, 200 to 300 yards. I thought then and still think now that, assuming an accurate aim, the majority of misses on long field shots result from error of range judgment. Just about any high velocity cartridge would produce mostly hits at medium ranges for an expert rifleman, but at the outer end of the practical trajectory curve, small differences between estimated and actual range would result in over- or under-shooting. A relatively heavy bullet at the highest possible velocity would hold velocity farther out and therefore flatten that outer curve,

(In fact, this was the reason that my friend Norman Joseph hunted woodchucks with a Model 70 Bull Gun in caliber .300 H & H Magnum, using 172 grain W. T. & C. boat-tailed bullets with maximum charges. He had to be careful about his backstops, but where we hunted nobody much cared about the heavy report. At shorter ranges his rifle was not as good as a Swift or a Varminter, but beyond about 250 yards it shot very flat; it was accurate and Norman was a fine shot and his big rifle collected its full share of hits.)

The heavy, hard Hubalek barrel was turned to a heavy sporter configuration at the breech. It was intended to turn it to 3/4" at the muzzle, but it was so hard that turning was a problem, and it was left a little heavier — about .900" at the muzzle. The rearmost part about 1-1/2" forward of the receiver was turned truly cylindrical so that the rear telescope block could be mounted there and would be parallel with the bore. The front block was the usual 7.2" farther forward, and was a normal low block. One result was to lower the rear mount about 1/8" from its height if it had been mounted on the receiver ring. Furthermore the low front block forced the telescope tube into the lower part of the rear telescope mount thus lowering the center line of the telescope still more. The bolt handle had to be reforged in order to clear the ocular end of the telescope despite the fact that it had ordinary high target mounts.

A patent trigger (I no longer recall the brand; perhaps a Dayton-Traister) was fitted. The stock was made from an inletted blank supplied by Harris Gunstocks of Richfield Springs, N.Y. They had a 20-spindle war surplus stock-shaping machine and for a few special customers they saved their worn cutters. By using a worn (and therefore slightly undersize) cutter to inlet a stock, they produced one that was too tight a fit to accept a barrel and action without custom fitting. With such a stock the inletting was laid out mechanically, and yet I could spot the

barrel and action in and get a very careful fit. Furthermore they could inlet a stock without shaping it first, so that from their "square" blank I could shape a target stock to my own preference. Last, they could select stock blanks from their supply; for a target rifle I preferred a board-sawn blank with good grain at the wrist, and as nearly the center flitch from the log as possible. "Scotty" Harris never let me down.

The stock for the big Swift was made from a selected Harris blank. The structure was about ideal, though there was no figure, and though the upper edge was light-colored sapwood that meant that the top half inch or so of the comb had to be stained to match the rest. There was no such thing as fiberglass bedding at the time, so the metalwork was spotted into the stock with the greatest care, and the stiff barrel was bedded to give a good deal of upward pressure at the forend — probably 10 or 12 pounds. The comb was held very high with a generous cheekpiece. A close-fitting rod in the bore would just barely clear the comb. The cocking piece on the bolt assembly would not clear it, and a notch or groove had to be cut in the top of the comb nose to allow the bolt to be withdrawn. This was about 3/8" deep and 1-1/2 inches long, and over the years the cocking piece marked the corners and edges a little; I always wished I had lined the groove with a horn block or maybe one of blued steel.

The pull from trigger to buttplate was as long as the blank would allow, about 14 inches, The butt was not cut off flat with a panel saw, but was carefully fitted to the gentle curve of a steel buttplate for a Remington 513 T rifle. Then the center of the butt was very slightly relieved — perhaps a few thousandths, a shaving or two — and a rubber target buttplate fitted with two stout screws. The slightly flexible buttplate conformed readily to the curve of the butt end of the stock. A lot of pitch was included. Whether the stock so configured was better to shoot I really don't know but it certainly looked better.

Sling swivels, front and rear, were standard forged-base swivels for a 1903 Springfield, put on with the standard heavy Springfield screws, and there was a standard US 1-1/4" shooting sling. There was no need to fit an adjustable front swivel, since I was to be the only shooter, and I knew that my front swivel should be 14 1/2 inches ahead of the trigger. The forearm was made flat on the bottom, and tapering upward at the sides, and about 1-7/8 inches wide. The extra width was carried back along the sides of the magazine to increase the stiffness of the stock; only behind the magazine did the sides begin to taper into the pistol grip.

The stock had several soaking coats of bar and table top varnish on all end-grain surfaces, each allowed to dry hard. Then the whole stock was varnished two or three times all over and then rubbed down with automobile wet and dry paper, about 600 grit, backed by a rubber block. Then it got a couple of coats of tung oil, also rubbed down, and finally several dressings with a very thin solution of boiled linseed oil and turpentine, about one part oil to four or five parts turpentine, the oil colored with alkanet root.

The pistol grip was checkered, purposely with coarse spacing about 16 or 18 lines to the inch. This was a working rifle; a half-mile hike through a rough upstate pasture can leave you with a sweaty, slippery palm. The forend was not checkered. I habitually hunted without a shooting glove, and when your left hand is strongly squeezed between the forend and the sling sharply executed checkering can be unhelpful and even painful.

The rifle was chambered to standard Swift headspace specifications. In fact, factory-new loaded shells were used for headspace gauges, a new one for every try. The result was that the bolt would just close on a factory shell, using extra pressure on the knob. When fired, standard Swift shells reformed themselves to the new straighter-sided and sharper-shouldered shape, and I never had a shall damaged in fire-forming.

At the time Weatherby had reformed the Swift case into the .220 Weatherby Rocket, and had published a load of 44 grains of DuPont IMR 4350 with a 63 grain Sierra bullet. Since my case capacity was very slightly bigger than the Rocket, I took that as a starting point — but the load flattened primers pretty flat and I decided that I better back off a little. I tried 43 grains, and all seemed well, and that became my working load.

Continued on next page

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A Wildcat Swift, The Ultimate "Golden Age" Varmint Rifle *Continued*

If anything the rifle shot marginally better with 44-grain loads, but it would quite reliably deliver 1-1/2" five-shot groups at 200 yards with the 43-grain load, and that seemed good enough. I zeroed it to strike 2" high at 200 yards, and while I never had a measured 300 yard range I thought it struck about 2" low at 300 yards. At an estimated 350 yards I held about 6" or 7" high and never had much trouble connecting. Of course the (relatively) heavy bullet at high velocity struck like lightning; a woodchuck was almost always either missed or killed outright.

One of my old mentor M. S. Risley's circle of upstate New York friends was Lyle Kilbourn of Utica, originator of the K-Hornet and, later, a succession of "K" versions of other conventional cartridge cases. By the time I built my big Swift, Lyle had gone to work for the Lyman Gun Sight Company, who produced Ideal loading tools. Visiting the factory about 1953 I ran into Lyle whom I knew very well, and chatted with him about loading a blown-out Swift for my purposes. He agreed with the theory but warned against my heavy charge of 4350 powder, maintaining that the powder was so slow-burning that the 63-grain bullet was started down the barrel before ignition was complete, with the result that part of the charge burned in the back end of the bore. I understood his point, but I had a load and a rifle that did what I had set out to have them do, and I was reluctant to change.

Not long afterward, M. S. Risley and I stopped to see Clyde Hart, then in the earlier stages of his fame as a barrelmaker. He was interested to hear that I had a Hubalek barrel, and he had just acquired a Kollmorgen bore microscope. I had my rifle, then a couple of years old along, and we ran the borescope down it. I was pretty severely shocked; the rearmost five or six inches of the rifling showed a good deal of erosion. Lyle Kilbourn seems to have been right.

It was at about this time (late in 1954) that I accepted a job at Old Sturbridge Village, the outdoor museum in Massachusetts. Two years later I became the director of the Idaho State Historical Society, and from then until my retirement in 1982 I was continuously director of major historical agencies or museums. Time to indulge in woodchuck hunting or target shooting mostly vanished. After 1954 I fired this rifle only about fifty times.

Aside from the problem of bore erosion (probably soluble with a more carefully developed load) the rifle did what it was intended to do. It shot with great accuracy, and it apparently had the proposed flat trajectory from 200 yards out. Furthermore it was the best rifle to shoot prone that I ever knew; its high comb and low telescope, the pitch of its rubber buttplate the coarse checkering of its close pistol grip, and its flat-bottomed forend all combined to make it easy to hold hard — if hard holding is ever easy. By the standards of its day it was very successful.

H. J. Swinney
Rochester N. Y.

CODA

Three years ago Jerry Swinney gave me the big Swift. Despite the wear Clyde Hart discerned, the rifle today shoots well with its original load and modern equivalents. I doubt that Jerry made a mistake in his choice of powder; at least I have found no other as accurate. I tried 4064, a classic for the Swift in the 1950's, as well as Reloader 22, Winchester 785 and 760, H380 and even some well-preserved High Vel. No. 2. (Jerry thinks he also experimented with High Vel. in the rifle, since he had the propellant on hand. It was used in the standard '06 target load of the day.) Jerry's 43 grains of 4350 with the 63 grain Sierra semipoint beat everything for consistent accuracy, but its velocity kept testing out at only 3400 f.p.s. There was a remarkable variation by primer, with one bench rest version giving 140 f.p.s. less. I decided to work up to Jerry's hot load of 44 grains and got there with no pressure signs. Finally, I edged up to 45 grains, still with no signs of excess pressure. It produced 3560 f.p.s. with accuracy identical to the 43 grain load. After comparing trajectories I conclude that Jerry was getting at least that velocity [I know it should be "fewer" but it sounds wrong] with two grains less powder from his lots of 4350. I also experimented with various medium-heavy bullets (bullets of 60 grains and over were heavy — with no qualifier — in the days before fast-twist .224 barrels). Only the 60 grain Berger spitzer edged the 63 grain Sierras for accuracy. Given the available components, Jerry seems to have found the best possible load for the best possible varmint rifle.

Jerry calculates that he had fired no more than 1000 rounds through the barrel when Clyde Hart examined it, and that seems too short a life span for even a blown-out Swift, but my suspicion is that the problem lay in the barrel rather than the powder. It was hard (to work at any rate) but maybe it wasn't hard in the ways that mattered. Or maybe Hart's then-novel borescope revealed a state that was common in hot-shot .22's with that much use. After all, the barrel is not shot out. On my 242 yard range it still groups regularly into about two inches.

I intend to donate the big Swift to the Rifled Arms Historical Association as a superb example of its type with unequaled documentation in the form of Jerry's essay. That'll be in my will however. They'll have to pry my cold dead fingers from around it.

Russell S. Gilmore, Ph.D
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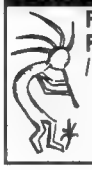
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Roger Bacon, Bobby, and Me

BY HAP ROCKETTO

An old shooting friend, who had been out of the game for a while, recently took a job at the same school in which I teach. Mike had retired from his civil service engineering job of some 30 years and wanted to move onto a new phase of his life. One of the selling points of entering education was that now he would have more time to devote to shooting.

Things had changed since he last shot center fire and he was working hard at catching up on the many new developments in powder and ball. One morning he appeared at my office door with a reloading book tucked under one arm and a host of questions on a sheaf of papers clutched in his hand. The questions revolved around velocity, case capacity, and powder selection. A quick look at any page of a reloading manual will show that there are usually seven or eight powders for any given bullet. For the .308 Winchester 168 grain competition load alone there are more than a dozen and a half recommended powders. As we started to discuss the various aspects of powder selection I suddenly remembered my first experience with gunpowder.

It was a rainy day in the middle of the summer of, I think, 1957 and my best friend Bobby Turisco and I were lolling around his house. We were at loose ends because our plans to go to the beach had been foiled by the weather. In an attempt to make the seemingly endless day pass a little faster we were sitting on the floor of his bedroom listlessly leafing through the pages of the family's newly acquired Encyclopedia Britannica. Any parent knows that a rainy day and a pair of ten-year-old boys is a volatile combination and likewise was Bobby's discovery. It was to occupy most of our waking moments, and our inconsiderable intellectual capacity, until it was almost time to return to school.

I had been trying to find an entry for Captain Marvel, to no avail, and as a consequence was wondering why these books were considered to be of great value. Bobby, on the other hand, flipping through the pages came to the entry for gunpowder. This grabbed his attention and he jabbed me in ribs with his elbow as he began to read aloud. We were not strangers to the subject, my dad owned a couple of guns and my brother was on the high school rifle team, but we were not well acquainted with it either.

We read through the paragraphs detailing the evolution of gunpowder from the ancient China of the Wu Dynasty to Oxford's Merton College's Roger Bacon and on to the Delaware days of Eleuthére Irénée du Pont de Nemours. In our reading we had stumbled upon the formula for black powder and were determined to replicate Bacon's great 13th century discovery at Oxford in a vacant lot on Avery Court. Had we been more interested in our intellectual development, as opposed to mischief, we would have learned how to pronounce du Pont's name instead of embarking down a road laced with larceny and danger.

The first problem facing us was to gather the materials. Charcoal was no problem as both families had barbecue grills, gas being decades in the future, and bags of the stuff were readily available. Oddly enough, sulfur would also present no problem. It seemed that our next-door neighbor, kindly old Mrs. Bradford, kept a huge dog in a Cyclone fence pen in her back yard. In that locked enclosure sat a pair of dog dishes, one religiously filled with food each day while the other was topped off with water as needed. Lying at the bottom of the water dish was a large cake of yellow sulfur that was allegedly good for the mastiff's health. We had come across this fact some weeks earlier as we helped Mrs. Bradford haul out a sack of dog food during one of our aimless summertime wanderings.

Each evening Mrs. Bradford and her dog took a walk. Bobby and I planned on nipping into the pen and taking the sulfur

Continued on next page

Roger Bacon, Bobby, And Me

Continued

while dog and mistress were out for their evening perambulation. That night we skulked in the shadows between the houses until Mrs. Bradford clipped the leash on the monster and strode off into the dusk. As soon as the pair was out of sight we made for the gate only to find the padlock inexplicably locked. Desperate for the sulfur, and frightened of discovery, we somehow managed to push and pull each other up and over the fence, tearing off bits and pieces of our clothing and skin in the process.

Bobby unhesitatingly plunged his hand through the dog slobber and saliva scum that covered the water, grabbed the precious yellow block, and stuffed it into his pocket. We then repeated the ordeal of clambering over the fence to affect our escape. Scuttling back through the darkness we arrived at the loft of Bobby's garage, which was our clubhouse and laboratory. There we hid the sulfur and then tried to repair the damage that the fence had wrought on our skin, T-shirts, and jeans.

The final ingredient we needed was Saltpeter. Finding it was to become a real challenge that tested our every wile. We did not know where, or even if you could buy it, but our reading told us it could be found as a white crystalline structure under manure piles. A lifetime of wandering in and out of every nook and cranny of our neighborhood had turned up an unusually large number of noxious items but never a manure pile. Desperation was setting in on us. In a last ditch effort to obtain the precious substance Bobby and I even asked our astonished parents for ponies so we might start our own manure pile. The request was summarily denied. However, our successful sortie into the dog pen had only made us bolder as we drew closer to our goal. The lack of a convenient manure pile would not deter us from our objective.

We thought that we had reached a dead end. However, we remembered that from time to time the older boys on the street would mention Saltpeter with a chortle but, in those prepubescent and innocent days, we had no idea what all of the snickering was about. These guys were sophomores in high school and quite worldly. Soon after discovering that the older boys had knowledge of Saltpeter we began to hang around them, all the while carefully not trying to be pests. Desperate times called for desperate measures. They had cuffed and humiliated us for their own amusement on more than one occasion so we knew the dangers of attracting their attention and incurring their wrath. 'Indian rope burns' and 'red bellies' were delights that we would rather avoid.

Carefully ingratiating ourselves as much as possible by fetching baseballs hit into the thorn filled thickets, laughing at the jokes they told and that we did not understand, and doing odd errands to curry favor we soon became ubiquitous. They began to tolerate our presence, our comings and goings were accepted, and we became invisible to them. All the time we listened and casually probed for information about this Saltpeter stuff.

Our patience paid off when one of them dropped a gem from his chemistry class. Saltpeter, or Potassium Nitrate as it was formally known, was also called KNO3! It was then we pounced. We had seen little bottles marked KNO3 in the chemistry sets that Skinny Eddie and Big George had been given for their birthdays. On the pretense of running errands for the big guys we got past their summer-harried mothers and into their rooms. There we ransacked the blue metal boxes that housed the A.C. Gilbert chemistry set popular at the time. Soon a small envelope containing our booty was tucked under Bobby's shirt as we scurried back to our garage/clubhouse/laboratory. We knew we were home free. We immediately disappeared from the older boys' lives and they apparently never missed us, or the Saltpeter.

The next step was easy. We hacked up the charcoal and sulfur into little chunks with our jack knives. After dumping the smaller pieces into a heavy bowl-like flowerpot which we used for a mortar, another fruit of our larcenous lifestyle, we then ground it as fine as we could using the blunt end of my brother's Duke Snider Louisville Slugger as a pestle.

Now that we had all of our ingredients in place all we had to do was mix them. This was a little harder to do than we thought because we were not all that familiar with percentages. Fortunately, for us, one of the older guys was unhappily working his way through summer school arithmetic. Our light fingers found the book and we quickly learned the rudiments of percents before returning the book to its rightful owner.

As we had no scale we roughly measured out the three components by volume using my mother's measuring spoons. Placing the three chemicals into a baby food jar we carefully mixed them with a Popsicle stick. We had

Continued on page 62

The Accurate Rifle

From the staff of ***Precision Shooting*** magazine... whose masthead motto declares "Dealing exclusively with extreme rifle accuracy"... comes a second publication, focused on the same general topic as its widely respected parent. ***The Accurate Rifle*** will leave coverage of organized, competitive shooting (Benchrest, highpower, smallbore, 1,000 yard, etc.) to its parent publication. All other areas of rifle coverage that are found in the pages of the unique and singular ***Precision Shooting*** will also be found in ***The Accurate Rifle***: rifle testing (both factory and custom rifles)... scopes evaluation... accuracy gunsmithing... do it yourself modifications... practical field shooting... tactical rifles evaluation... accuracy handloading... varmint shooting... custom actions... match grade barrels... custom triggers... match quality bullets... accuracy history and nostalgia. It's all here, with the same droll humor and self deprecating philosophy that have long been a trademark at **PS**. The staff writers at ***Precision Shooting*** and the former ***Tactical Shooter*** (now re-focused and renamed ***The Accurate Rifle***) are among the most respected writers today in the firearms journalism field.

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Two reasons, really:

1) A second unique publication, in the style of its parent. Neither is a news-stand magazine, and have no plans of ever becoming one. To go that route we would have to undergo a total culture transformation, and begin thinking of this as a business. We would rather continue thinking of it is the greatest and most interesting avocation in the world.

2) The oft repeated observation (We've heard it hundreds of times)... "I've stopped all my other firearms subscriptions. Gad, but I wish ***Precision Shooting*** came twice a month". Guess what... now it (virtually) does!

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Roger Bacon, Bobby, And Me

Continued from page 60

read enough of the gunpowder article to know that one did not use metal implements in the manufacture of gunpowder. In our eyes the contents of the jar were more valuable and potent than the Uranium 238 produced by the Manhattan Project. In our hands it was probably more dangerous. Our gunpowder was then carefully stored until we could steal some matches and figure out a way to ignite it without killing ourselves.

A couple of days later we slipped off to the vacant lot up the street. Piling our homemade powder on a square of toilet paper we twisted another foot or so of the stuff into a crude fuse. We then pulled our ball caps tight down onto our heads and donned stolen sunglasses. As children of the Nuclear Age we had seen plenty of grainy black and white newsreels narrated by Lowell Thomas or Ed Herlihey showing scientists and soldiers pulling down tinted goggles as a countdown approached zero. Unsure of the magnitude of the forces we might be unleashing we at least wanted to be prepared.

Bobby, because he was a bit older, and because we used his garage for a hideaway, claimed the honor of setting off our creation. Hunkered down to protect the match from the wind, with trembling fingers, he struck it several times until it spurt into flame. The fuse took light and we lit off to duck behind our tree stump blockhouse. With fingers in our ears and eyes squeezed into slits we peered through sunglass-dimmed vision as the flame crept towards the powder.

Our rough tongues vainly tried to moisten our excitement-dry lips as the yellow and orange dervish whirled closer to the small black pile. I am sure that Robert Oppenheimer felt no greater anxiety, apprehension, and fear, when he supervised the test of the first atomic bomb in 1945, than we did that morning twelve summers later. After what seemed like an eternity the flame reached the black pile and there was smoldering, sputtering, and puffs of dirty gray smoke. There was no bright flame or earth shattering bang to mark our triumph but it didn't matter to us. We had succeeded in making gunpowder. We could go back to Harbor School in a few weeks and brag to all our sixth grade school mates about our grand summer adventure.

Our security had been equal to the best of any of the wartime clandestine activities of our government. We managed to keep the whole exploit a secret from the adult world, with one minor exception. Bobby was a Roman Catholic and, as we had lied, stolen, engaged in burglary, and possibly violated several laws of chemistry, his conscience troubled him. He had had his First Holy Communion a few years earlier and knew the wages of sin.

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My heart was lighter as my religion believed that I was not responsible for my actions until I was adjudged an adult. Until then they were on my Dad's soul, and this may well have explained why his shoulders always seemed so bowed. Entry into the adult world would not happen until my Bar Mitzvah some two years hence so I was off the hook. Bobby, however, came from a devout Italian family and he could not avoid taking Holy Communion the following Sunday without raising the specter of wrongful acts in the minds of his parents. To take the wafer in a state of grace he would have to attend confession to cleanse his soul before Mass. Please remember that these events all happened before Vatican II, in a time when religion was such a part of the fabric of our society that all school lunch programs, secular or religious, routinely served fish sticks on Fridays out of courtesy to the Catholic population.

When he broke the news that he had to confess to an adult I thought he was crazy. We had pulled off a kiddie coup of such heroic proportion that we would be placed at the pinnacle of the playground pecking order and now he wanted to spill the beans to an adult? Knowing that I was not familiar with the sacraments of the Church of Rome my best friend swore that what he told the priest could go no further. Reconciliation was a serious sacrament and the priest would suffer some terrible punishment should he even whisper a word of Bobby's confession to anyone. Bobby was my best friend and as such I trusted him without question, although I was not so sure about the priest. That Saturday our usual walk home from the movies took a bit longer as we detoured into the dark and cool confines of Saint Joseph's Church.

Maybe I did not yet have my sins charged against me but Bobby did, and, as you all know, he was my best friend. We sinned together so the least I could do was to stand by him when he 'fessed up. Bobby dipped his fingers into the blessed Holy Water, crossed himself, and ventured to the front of the church where he disappeared into, what seemed to me to be, a telephone booth, to ease his mind. This was my first visit to a Catholic church so I spent my time uncomfortably trying to look innocent, inconspicuous, and Catholic. I up took up station in the last pew closest to the door because if Old Nick himself appeared for me I wanted to be able to make a quick getaway. Bobby soon popped out of the telephone booth looking relieved, crossed himself as he knelt quickly, and we were out into the Saturday sunshine.

Sunday came and went and Bobby was able to preserve the illusion of innocence to his parents. Soon after, Labor Day arrived and with it, to our mothers' relief, the end of summer vacation. Little did they know that, for the first time in our short lives, we were also eagerly awaiting the start of school, albeit for different reasons. Our walk to school was taken up with reviewing our delightful tale in detail and anticipating how we would shine in the firmament of sixth graders. The story had grown in our minds and been embroidered in the retelling. Much to our consternation our friends did not fully believe our story.

As a matter of fact there was a school of thought that believed we had concocted the whole story. A second group thought we didn't have enough imagination to dream up such a story countered them. A third circle knew it to be a lie because no one ever wasted time during summer vacation by reading or studying arithmetic. Oddly enough that was the group that actually had read and ciphered during June and July because they were at summer school making up one academic deficiency or another. Our dream of becoming the princes of the playground remained just that, a dream, a dream that had disappeared just as our gunpowder did, smoldering and sputtering.

A blink brought me back to the present and our reloading discussion, I had been gone a whole summer in my mind but only a second or two in real time. Picking up where I had drifted off I pontificated, "I'm a 4895 man myself. A Three Oh Eight just needs a one sixty-eight HPBT and forty point five grains of 4895. Don't mess with anything esoteric until you have mastered that load." Satisfied with my advice Mike went off not knowing that he had been talking to one of the great powder manufacturers of all time.

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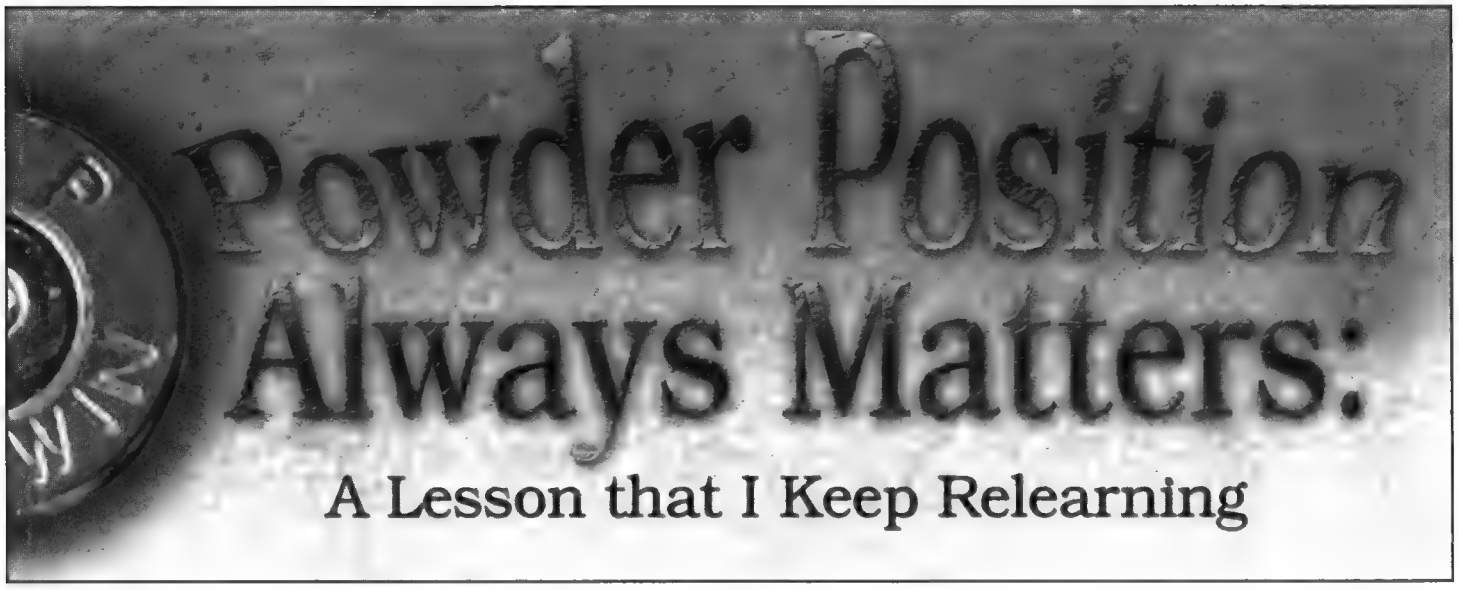

Powder Position Always Matters:

A Lesson that I Keep Relearning

BY M.L. McPHERSON

Synopsis: Powder position in uncompressed charges (equally, powder packing scheme in compressed charges) is a critical issue in all aspects of internal ballistics. Two recent tests, one with a batch of firelapping loads used in a 358 Ackley Improved, demonstrated, again, that powder position can have critical effects on both internal ballistics and, by extension, accuracy.

Since an initial shock, received while testing 38-40 ammunition, I have gone out of my way to note ballistic differences associated with powder position that occurs in smokeless powder loads where the charge does not completely fill the available space. In dozens of tests, comprising various combinations of powder and load type, I have never seen an example where powder position was not a significant factor in both velocity and uniformity. Typically, powder position makes an enormous difference. (It is noteworthy that SAAMI has long recognized this effect and specifically prescribes measures intended to limit this source of ballistic nonuniformity for all tested ammunition.)

Consider two recent tests. Most recently, I fired Black Hills factory 44 S&W Russian loads in an original revolver — quite an honor and the basis of an article for a different publication. When fired normally, that ammunition produced perfectly normal results and impressive accuracy. However, when tested for powder position effects, the results were startling, at least to an uninitiated observer who happened to have observed that test. The following table clarifies this point.

Please understand that Black Hills Ammunition has worked diligently, and closely with this author, in an effort to minimize powder position effects in this sort of load and that they have been unusually successful in that effort. Concerns related to this specific problem were behind their reintroduction of the 44 Russian and 45 Schofield cartridges, specifically for Cowboy Action loadings. While it would have been easier to simply load the otherwise similar but longer 44 Special and 45 Colt cases with loads at the same performance level, that approach was deemed too dangerous. First, it increases the potential for the occurrence of a detonation — this phenomenon is inversely related to the percentage of the case filled by the charge. Second, it increases the potential for a bullet-in-bore condition — which could result from an extreme example of the powder position effect. Black Hills is sufficiently concerned about this problem that upon learning of these results they immediately began reevaluating this particular loading. They are perpetually searching for a superior (low-density with rapid ignition) smokeless powder for this type of loading.

44 S&W Russian, Black Hills Factory load, Powder Position Effect Testing

Powder Position	Velocity	Standard Deviation
Toward Primer	687	36
Level Across Bottom	633	24
Toward Bullet	632	14

(Note: firing this ammunition from a single chamber would probably produce significantly less standard deviation; Black Hills sees <10-fps standard deviation from the test barrel.)

The average velocity difference noted amounts to an energy difference of about 18% and a similar difference in peak chamber pressure. Perhaps more startling is the difference in ballistic uniformity, which is typical in this sort of test. Allowing the powder to settle against he primer always results in significantly higher pressure and dramatically higher shot-to-shot ballistic variation.

Note that I have seen far greater differences in other loads. The same basic test showed a powder position effect of 143 fps in one batch of factory 38-40

ammunition; this effect exceeded 500-fps in one batch of handloaded 38-40 ammunition (in which I had used a completely inappropriate powder).

What prompted this article was an experience I had while firelapping my 358 Ackley Improved, Model-99. I had prepared the loads using *QuickLOAD* for a predicted maximum chamber pressure of about 35,000-psi, when using RedDot and 200-grain Hornady RN bullets in front of R-P 2½ primers.

Everything seemed to be going well as I progressed through the firelapping steps. However, occasionally I would get a sticky case, despite the fact that muzzle velocity was normal for that shot, which seemed quite odd. Slow as I can be on the uptake, eventually, this began to bother me. I then remembered that it was long ago proven that one way to bulge a barrel was to use a partial powder charge and then position that toward either the bullet or the primer. Since the charge I was using occupied only about 50% of usable case capacity, it occurred to me that perhaps powder position was rearing its ugly head.

To see if this were the case, perhaps foolishly, I then fired a set of shots where I had first positioned the charge against the primer (by elevating the muzzle, rapping the side of the gun with the palm of my hand and then carefully lowering the gun into position on the bags). Eureka, while muzzle velocity was essentially unchanged from the loads fired when the powder was evenly distributed across the bottom of the case, pressure was sufficient that I had to use a hardwood dowel and a good sized block of wood to hammer the cases free from the chamber. The included photograph shows the evident pressure differences on the primers (relatively exaggerated, owing to use of pistol primers) and the damage done to the case heads in the powder-back test loads.

The curious thing here is that velocity did not reflect evident peak pressure. I believe that this is ample proof that a pressure wave was developing in the chamber so that the case was repeatedly hammered, as said wave bounced back and forth. As the bullet began to move and this wave dampened, pressure returned toward a normal smooth curve and, in any case, average pressure was no different than with a normal load where such an oscillation did not occur, hence velocity was normal.

I should also mention that this effect has been proven to be significant, even when the charge fills practically the entire usable case capacity, by none other than Mr. Ken Oehler, dean of pressure testing. Furthermore, even with compressed charges, owing to the fact that the primer blast compresses the charge, a related effect also affects internal ballistics (and accuracy) whenever the powder packing scheme varies from one load to the next. This is an effect that I have proven repeatedly and which explains why benchrest shooters get best accuracy when using dropped, rather than weighted charges — fodder for another article.

In closing, I hope to encourage everyone who uses any load in any gun where the powder charge does not essentially fully fill the powder chamber to make an effort to ensure that the charge has not settled against the primer before firing the round. At the very least, this will improve accuracy. At the very most, it might prevent a truly bad occurrence. Meanwhile, good shooting, one and all.

All five loads were essentially identical. While these are R-P 2½ (pistol) primers and therefore, show a disproportionate difference in flatness, in response to changes in peak chamber pressure, it is clear that significant pressure differences occurred. Note the partial extrusion of the two lower case heads. Obviously, pressure was enormous. The only difference was powder position.

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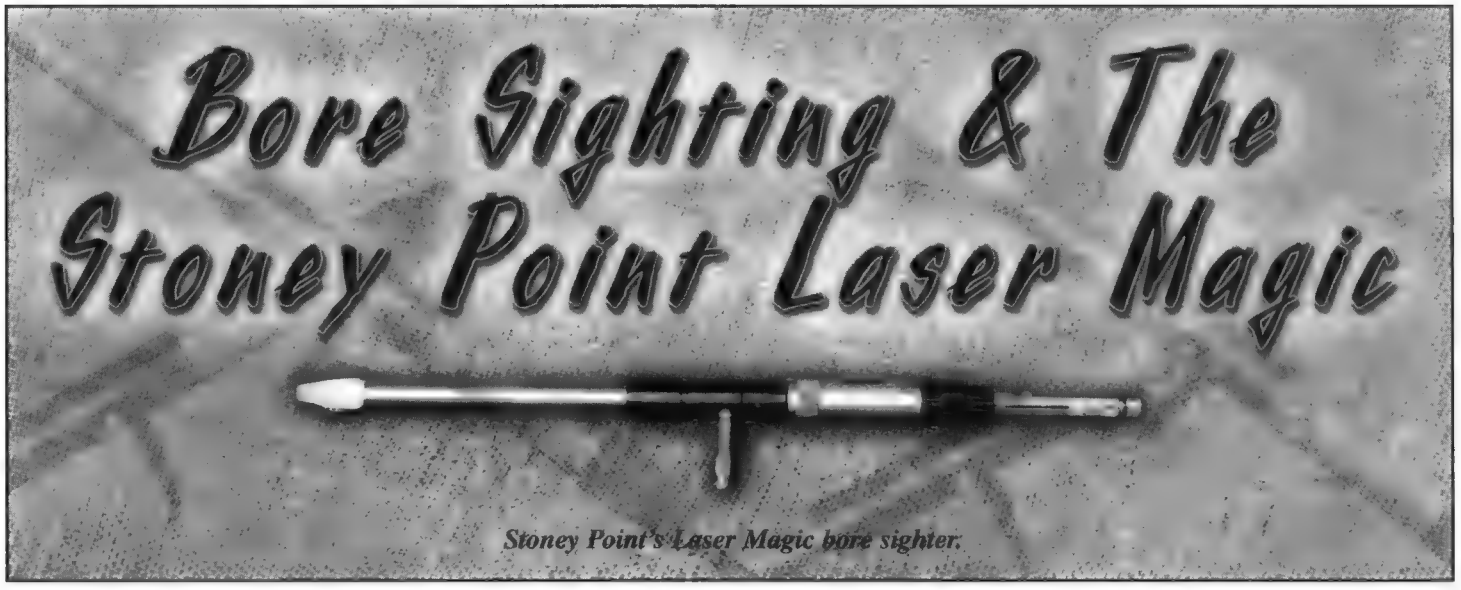

Stoney Point's Laser Magic bore sighter.

BY NORMAN E. JOHNSON

The fellow laid the rifle on my shooting bench with the expression of a Marine drill instructor. "Check it out...can't hit a thing with it!" I could see he had a few paychecks in the rifle and scope combo—a Weatherby Mark V 300 Magnum with a Leupold Vari X III, and Leupold mounting system. A careful visual inspection of the mounted scope indicated no obvious problem so I placed the rifle over the rifle rest directed toward the 100 yard target. The next comment uttered by the disgruntled owner was quite anticipated. "It's been bore sighted you know...should be right on." I said nothing as I carefully aligned the bore to the 14 x 14" target and raised my eye to view through the scope. The reticle was at least 16 inches high and a foot left, which surprised the heck out of the gun owner. I wasn't surprised. When I asked him to have a peek at what I was seeing, I tried to explain to him the logic of bore sighting a rifle.

The Principle of Bore Sighting a Rifle

By conservative estimate, I guess I've bore sighted upwards of a couple thousand firearms, including rifles, shotguns and scoped handguns. These include the many guns I have tested as well as those brought in for routine sighting or general maintenance over the years. I'm constantly changing scopes on my test rifles and I don't like to spend a lot of time in the process.

Over simplified, when a gun is bore sighted, the object is to have the bore and sight pointed or "looking" exactly at the same thing. This premise seems a bit basic, but is not fully understood by the vast majority of hunters and shooters I know. A good number of those having a scope mounted and bore sighted actually believe the gun is ready to be used afield; and a few who do the bore sighting job themselves think the gun is all ready to knock off that prize buck when they are finished. By coincidence, only a precious few guns are field ready after any method of bore sighting, but most are not even close. Over the years I have used a variety of methods to bore sight guns...prisms, lasers, various collimators and my God given eye, and after so doing, find most guns sighted somewhere on the 14 x 14-inch target I use at 100 yards. On rare occasions I find my first sighting shot within the small aim point at target center (usually an inch).

Not understood or believed by many is the fact that gun barrels do, indeed, whip around as a result of tremendous pressure and vibration during firing. Bullet departure angle isn't likely to be coincident with visual bore center at this

Applying fine adjustment of laser beam before bore sighting rifle.

time. Another reason bullet impact will vary from projected bore center is bullet trajectory. Even as close as 100 yards some slow moving, heavier bullets will impact target significantly below visual bore center. As a bullet, fired from a scoped rifle, moves toward a 100-yard target where—it is sighted in—it first must travel to a point where it coincides with the line of sight. This juncture is usually at about 25 yards, with most high power rifles accounting for the fact most rifles are sighted-in at both 25 yards and 100 yards. After the bullet crosses the line of sight at about 25 yards, it remains above the line of sight until its trajectory finds it dropping on target again at 100 yards, or where it is sighted. Some people are not easily convinced that the bullet isn't actually rising above the bore to meet the line of sight of a scoped rifle, when in fact, a bullet begins dropping from bore center line the instant it leaves the bore. The line of sight is actually projected below the path of the bullet to compensate for trajectory. The gun barrel is thus aimed or directed upwards to essentially lob the bullet toward its intended target, analogous to water from a garden hose being sprayed from below a perfectly straight piece of string positioned above the source of the water. The water is the bullet path and the string is the line of sight.

I have tried to explain this in such a way that it should serve to further complicate the simple act of bore sighting a rifle.

Common Methods of Bore Sighting

A common attempt to sighting in a gun is to simply mount the scope and bang away at a distant object until all the ammo is used up or patience runs out. By the time I see some of these guns the owners think I perform some sort of miracle sighting in a rifle with two or three shots. "How in hell did he do that?" is the usual response.

The next most common home method of bore sighting the bolt action rifle is to simply remove the bolt and peer down the bore and adjust the scope reticle to where the bore is looking. This technique works very well if performed correctly and is quite fast. No tools, no fuss. In the store or gun shop the collimator is, perhaps, the most popular method of bore sighting. Here the collimator is attached to the rifle via a spud or pilot to fit the bore and the scope is adjusted to the reticle of the collimator. When sighting the pump or lever or specific automatics, a small prism has served me well to view down the bore. Of course, the collimator serves here as well.

More recently some form of projected laser beam through the bore is used which includes a laser-equipped cartridge or the like. This requires a special fitted cartridge for each corresponding gun, which could number many and be very costly for the fellow with a bunch of guns in his rack.

Continued on next page

First published in 1951, over a million copies of this classic book have since been sold. A *Reader's Digest Condensed Book* long out of print, it is now available again exclusively from *Precision Shooting*.

This is Ross Carter's own story. It is a war book you can *believe* in, told in a simple, forthright way that makes it one of the most realistic and exciting, as well as the most moving, books to come out of World War II. It is a tribute to the 82nd Airborne Division, one of the hardest-boiled, fightingest groups any Army has ever seen. No wonder a German Army officer referred to them in his diary as "those devils in baggy pants".

Ross Carter was one of three men who survived the suicide stands of his platoon of paratroopers. His account of a death-daring unit of twelve men, bound together by deep comradeship, by pride in outfit, by love of one another, is touching. But it is humorous and intimate, too, and sharpened by a deep awareness of what it is all about.

Here is a war as it really was: the terror of hand-to-hand combat, the breathtaking suspense before the invasion jump. Its heroes are not the self-pitying sub-men of some recent war fiction. They are ordinary human beings, frightened as only brave men can be, who beefed, got drunk, took their women where they found them, quarreled violently among themselves, and yet achieved an epic grandeur in their deeds.

Good-humored Arab, who carried a worn copy of Homer with him from Africa to the Battle of the Bulge; Berkely, who feared nothing but snakes; lone-wolf Casey; little coconut-sized Finkelstein, who was a man's man; Carlton, the big Texas cowboy; old Duquesne; and the Master Termite, who had dug more foxholes than any man at Fort Bragg — they are only a few of these devils whom we come to know... and love. They call every buddy a joker, but their inarticulate grief as one by one the members of the group are killed — sometimes horribly — is almost unbearable. They kid each other sometimes in a kind of desperation to carry them through a hell that seems to have no ending.

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Bore Sighting & The Stoney Point Laser Magic

Continued

The Laser Magic Boresighter

Quite new on the scene is a unique method of bore sighting, which has been introduced by Stoney Point Products, Inc., New Ulm, Minnesota 56073.

I was first introduced to the aptly named—Laser Magic Boresighter by Mr. Tom Peterson, president of Stoney Point Products, who gave me a couple models to test. I'm from the old school who believe you shouldn't be the first to try the new or the last to cast out the old...but now, after well over a year, I can objectively report on Stoney Point's new and innovative method of bore sighting.

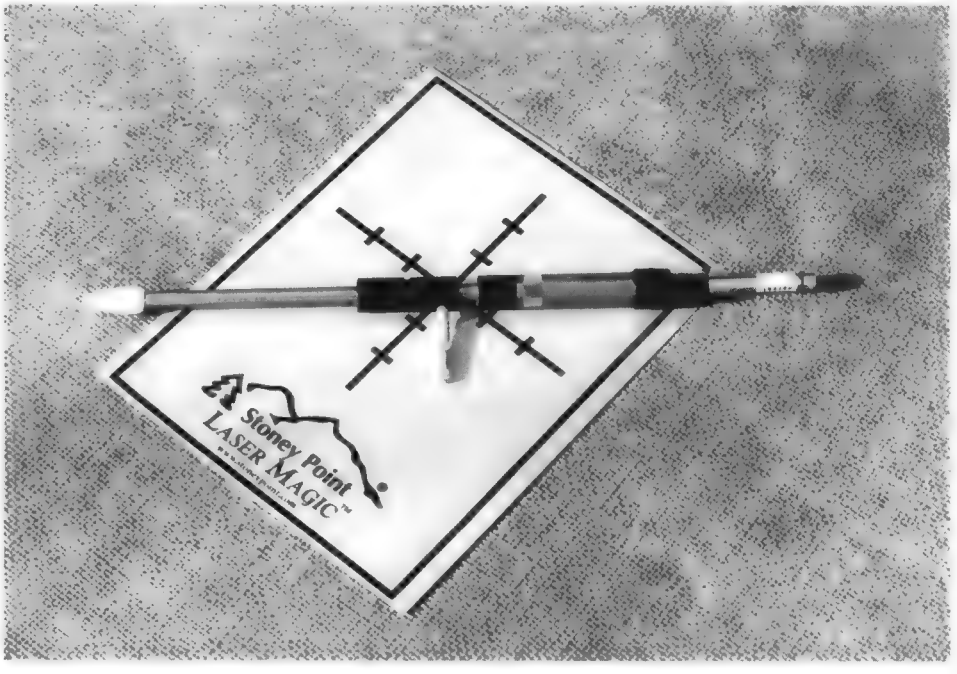
As with any method of bore sighting, the hope is to have your first shot on target so ammo is saved and temper flares are reduced. The Laser Magic fits snugly into the action replacing the bolt. The coned nose section centers itself in the base of the chamber of the bolt action rifle and locks in place at the bolt slot. A glance at the instructions with the unit provides the necessary details to properly use the boresighter, so I won't plague you with the extras here...but some basics are in order. The unit is fitted with a pair of eccentrics that, when turned, will precisely direct the laser beam down the bore. When the unit is first installed in the bolt channel and turned on, a rather poorly focused beam may be projected from the bore. Then, with the beam directed against a surface a few feet away, simply rotate the small or large eccentric and/or the laser module itself until an undiffused, well-defined dot is seen. You'll get the hang of this after playing with the boresighter awhile.

Once you've captured a nice, neat beam, it's time to bore sight the gun. This is best accomplished by placing the rifle over a steady rest at a target about 25 yards away. Where space is limited, guns can be bore-sighted at closer distances—even within a large room. Then, with the laser beam on target, adjust the scope reticle to coincide with the laser beam.

As I pointed out earlier, bore sighting at 25 yards will find most rifles also sighted at 100 yards. When viewing the laser in bright light, best results will be obtained using reflective material to focus the laser on. Minimally, a light surface is recommended. Scopes of four power or greater will pick up the laser beam at 100 yards on a light surface, and even better on an illuminated surface.

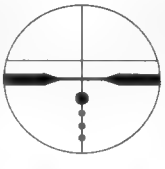
Having coordinated the laser beam and scope reticle, your first shot should be within a few inches of your aim point at 25 yards, and well on a square foot size target at 100 yards. This will depend, of course, on how well you've centered the beam through the bore and adjusted the scope reticle, or how whippy your gun barrel is, along with bullet trajectory. Stoney Point recommends using their Muzzle Reducer to help assure better laser/bore alignment on calibers size .270 and larger. This part fits nicely over the barrel of most guns, but with care in setting up, I have experienced no problem in bores up through .30 caliber.

As a pretty stringent test of the Laser Magic Boresighter, I chose 14 of my pre-sighted rifles ranging in caliber .224 through .30. These rifles were all sighted at 100 yards and wore a variety of



Laser Magic boresighter with special illuminating target available for better viewing of laser.

Range estimate distance using the power ring on a variable scope. Specify: animal size & distances to estimate. This reticle will range & hold over 200y-600y. Add extra lines to range estimate other size objects.



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scopes mounted at varying heights above the bore. So with this test the control rifles were all sighted in and it would be up to the Laser Magic to demonstrate its degree of efficiency at varying distances. For comparison I also checked each rifle with the visual bore sighting method and recorded these findings in Table I. some instances I would remove and replace the Laser Magic from the rifle after viewing its beam position to better determine how well it would repeat. It fared quite well in this test, which depends somewhat on how accurately the user centers the laser to the bore. The Table shows a respectably high level of bore sighting efficiency by the Laser Magic Boresighter. (See Table I.)

Bore sighting is not an exact procedure, regardless of the method used, largely because of so many variables that influence the bullet flight, even from a perfectly aligned barrel. The overall principle incorporated into the Laser Magic Boresighter is very sound, and performance will likely be commensurate to the user's ability. I believe the Laser Magic does exactly what it was designed to do.
(See Table I)

Norman E. Johnson
N2162 80th Street
Plum City, WI 54761

Continued on next page

Boresighter battery and switch assembly showing twin eccentrics used to cone down the laser beam.

Laser Magic boresighter being used on Winchester Model 70 bolt action rifle. Rifle rests firmly across rifle rest and rear bag. Note: how the mini-bolt holds the boresighter in place via the rifle's bolt recess.

Viewing through scope before final boresighting operation.

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Bore Sighting & The Stoney Point Laser Magic *Continued*

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RIFLE/CALIBER/BARREL	SCOPE & POWER USED	HEIGHT ABOVE BORE & SCOPE MOUNT	100 Yd. VISUAL BORE-SIGHTING & RETICLE POSITION	
Rem 700 Varm .25-06	B & L 4x16 12X	1 3/4" Redfield high rings	5" high	2" Left
77 Ruger Varm .243	Redfield 6x18 6X	1 5/8" Ruger rings	3" high	2" Right
M70 Win Std.220 Swift	Burris 4x12 10X	1 5/8" new type stainless	2" high	0" L/R
98 Mauser .300 Win Target	Leupold 12X 12X	1 1/2" Redfield	0" high	0" L/R
M70 Win .243 Varm	Redfield 12X 12X	1 1/2" Redfield	2" high	1" Left
M70 Win .270 Varm	Lyman 10XAA 10X	1 1/2" Redfield	0" high	0" L/R
Repeat test "	same	same	0" high	0" L/R
M70 .270 std. wt.	Redfield 2x7 7X	1 1/2" Redfield	3" high	0" L/R
Rem 700 .284 std.	Leupold 3x9 9X	1 3/4" Redfield	0" high	3" Right
M70 .225 Varm	Leupold 8X	1 5/8" Redfield	0" high	8" Right
Savage M112 Varm .223	Leupold 4x12	1 7/8" Redfield	0" high	0" R/L
Win.M70 Varm .22-250	Sightron 6x24 12X	1 3/4" Redfield high rings	5" high	2" Right
Rem.40X 7mm Mag.	Sightron 4x16 12X	1 3/4" Redfield high rings	6" low	1" Right
Win.M70 Varm .257 Imp.	Unertl 10X	1 1/2" Redfield med.	2" low	0" R/L
Win.M70 .220 Swift Varm	B&L 4x16 12X	1 1/2" Conetrol	3" high	0" R/L

TABLE I.

LASER POSITION WITH SCOPE RETICLE ON TARGET ALL RESPECTIVE RANGES

12 1/2 Yards	25 Yards	50 Yards	100 Yards
1" low 1/4" L.	1/4" low 1/4" L.	1" high 1/2" L.	4" high 1 1/2" L.
2" low 1" R.	1" low 1 1/2" R.	1" high 2" L.	3" high 7" R.
2 1/2" low 0" L/R	3 1/2" low 0" L/R	3" high 0" L/R	5" high 0" L/R
1" low 0" L.	0" low 1" L.	1 1/2" high 0" L/R	3" high 0" L/R
1 1/2" low 1" R.	2" low 2" R.	0" low 0" L/R	0" low 3" R.
2" low 0" R/L	2 1/2" low 0" L/R	4" low 0" L/R	5 1/2" low 0" L/R
1" low 0" R/L	1" low 0" L/R	2" high 0" L/R	6" high 0" L/R
2" low 0" R/L	0" low 0" L/R	1" high 0" L/R	0" low 0" L/R
1" low 0" R/L	0" low 0" L/R	0" low 0" L/R	5" high 0" L/R
1" low 2" R.	0" low 3" R.	1" high 7" R.	5" high 8" R.
0" low 0" L/R	2" high 0" L/R	4" high 0" L/R	2" high 0" L/R
1/2" low 0" R/L	0" low 0" L/R	3" high 0" L/R	6" high 0" L/R
2" low 0" R/L	4" low 2" R.	7" low 6" R.	10" low 4" R.
2" low 0" R/L	3" low 0" L/R	4" low 0" L/R	6" low 0" L/R
1" low 0" R/L	0" low 0" L/R	3" high 0" L/R	6" high 0" L/R

Norman E. Johnson, N2162 80th Street, Plum City, WI 54761

BY IRV BENZION

Over the years I've posed this question to a number of people, "How can you tell when the firearm you are cleaning is finally clean?" The query was not rhetorical. I was looking for someone to tell me exactly what the parameters for a clean bore were.

Was a slightly streaked patch acceptable? What about patches whose surface exhibited the brown-black impression of the lands, or did the patch have to be spotlessly clean?

Pundits writing in books and publications seem to universally state that a firearm is not really clean unless patches emerging from the muzzle are unblemished. This is a state I was never able to achieve in all my years behind a cleaning rod until now, but more on that latter.

Like most, cleaning guns is not high on my priority list of fun things to do; so anything that makes the job easier or faster catches my attention. So, when an advertisement for a gadget that would catch soiled patches eliminating the need for me having to bend over and pick them up off the ground appeared in *Precision Shooting Magazine* (the monthly "tiny group" shooter's journal), I ordered one.

This was my introduction to the fine, and in my opinion, technologically advanced line of products offered by Bore Tech, Inc. It is apparent that Bore Tech's premise is basically innovative, they look for new solutions to problems facing shooters or ways to measurably improve existing products.

The gadget, named appropriately Patch Hog™ consists of a plastic base with a rubber orifice that slips over the muzzle. An empty 2-Liter pop bottle is screwed onto the opposing end of the Patch Hog™. Soiled patches after being pushed through the bore are ejected from the cleaning rod jag and are retained in the pop bottle. When the pop bottle is full of dirty patches simply dispose of it in the garbage, replacing it with an empty one.

Employing a Patch Hog™ keeps ranges clean and the rangemasters happy, as they no longer have to clean up after uncaring, sloppy individuals. And perhaps more importantly, it puts an end having to stoop over to tidy up one's own cleaning refuse. It was ingenious!

One humorous aspect of using the Patch Hog™ occurred when a shooter at the next bench asked, "What is that thing hanging on the end of your barrel?" It turned out the gentleman was a police officer and just wanted to make sure that the Patch Hog™ wasn't a home made silencer!

Cleaning Rods and Bore Guides

At the following year's NRA Convention, Bore Tech had a booth, which I

"The Patch Hog keeps things neat."

had an opportunity to visit. In progress was a discussion by the Bore Tech representative on the merits of two new Bore Tech products, cleaning rods and bore guides.

Already the proud owner of three Dewey™ cleaning rods, the outward appearance of Bore Tech's Bore Stix™ rods did not provide an obviously apparent reason to replace the Dewey's™.

Examination of the sample rods appeared that, like the Deweys, they were manufactured of a single piece of spring steel covered with a plastic sheath to prevent damage to the rifling caused by metal to metal contact. But appearances are deceiving. Bore Tech uses a proprietary process which coats the rod with a chemical and abrasion resistant material bonded directly to the steel substrate that offers far more protection to the rifling.

The use of sectionalized cleaning rods is not recommended for two reasons; first they are uncoated and can possibly damage the rifling and chamber. Second, under the pressure caused by a tight fitting patch or brush, the rod can bend at its joints causing possible damage to, or jamming within the bore

Almost all cleaning rods — and that includes Dewey™ rods — have handles that allow the rod to rotate to some degree, but here is where Bore Tech's innovative improvement sets their rods above all others. Located in the handles of their rods are dual sets of ball bearings and races, which allows the rod to rotate freely following the rifling.

A very common annoyance in rifle cleaning occurs when a brush or patched jag (which we'll refer to as the "tool") is pushed back and forth through a barrel. The tool will often unscrew itself from the end of the rod, lodging in the bore or falling to the ground. The reason the tool unscrews itself is because the rod does not rotate freely enough within its handle to allow the tool to follow the rifling in the bore.

To prevent the tool from disengaging, the movement of the cleaning rod must be stopped every few cycles to twist the rod in the opposite direction to re-tighten the tool. Since Bore Stixs™ spin effortlessly within their ball bearing handles, tool detachment is eliminated forever.

The second new offering lying on the table was Bore Tech's Patch Guide™. Patch Guide's™ unique feature is that it sports a wide rimmed shelf that is positioned at the opposite end of a

Continued on next page

"The Bore Stix by Bore Tech."

"The Patch Guide provides a tray to catch spills and boreguide all in one."

What's Clean?

Continued

rubber tipped metal bore guide. In application, a patch is laid on the shelf; cleaning solvent applied, and then the patch is picked up by the cleaning rod and pushed through the bore. The advantage provided by the rimmed shelf is that solvent is applied to the patch or brush without spilling or wastage. Excess solvent is trapped on the shelf to be absorbed by the next patch or swabbed up. Further, solvent is not squeezed from the patch causing it to splash onto the stock or into the action, a common occurrence with end loading bore guides.

Spear style jags should be ordered.

When purchasing Bore Tech's cleaning rods make sure to also order Bore Tech's spear style jags. Utilizing spear style jags makes it unnecessary to pre-mount the patch when used in conjunction with a Patch Guide™. This eliminates another step in the cleaning process because the patch lying on the shelf is automatically harpooned as the jag-tipped rod is inserted into the Patch Guide™.

Incidentally, never clean bolt action rifles without a bore guide. Numerous rifles have had their chambers and throats ruined by abrasion and damage when the cleaning rod is not aligned perfectly with the bore.

Convinced, I purchased two .22 caliber Bore Stixs™, jags, and a Patch Guide™.

Cleaning Procedure

Being impressed with innovations found in Bore Tech products, I took notice when their new line of chemicals appeared in *Precision Shooting Magazine.* I called Bore Tech offering to evaluate their merchandise in anticipation of a forthcoming article. My intent was to write nothing unless their cleaning compounds showed a significant advantage over the products I was currently using. Besides, I was still looking for that magic product that would once and for all completely clean the barrels of my firearms.

My normal cleaning routine is broken into two segments. The first consisting of powder fouling and carbon eradication, and the other, the removal of copper gilding metal stripped from bullets as they streak down the barrel.

To remove powder fouling, two or three patches wetted with a bore cleaning solvent is pushed through the bore in an effort to dissolve powder fouling and at the same time remove any particulate residue.

Next a bronze bore brush, also covered with the solvent mixture, is passed back and forth down the bore about ten times, followed by a couple of clean patches. This regimen is repeated 2-3-4-5 times depending on the amount of black smudges found on the clean patches.

Occasionally JB™ bore cleaner, a slightly abrasive cleaning paste was employed to remove embedded carbon and copper jacketing fouling. JB™ is placed on a patch or mop, which is then pushed back and forth between 10-20 times scrubbing the rifling. A used bronze bore brush can also be used to apply JB™ deep into the lands. JB™ bore cleaner relies on mechanical abrasion rather than chemical action for its effectiveness.

The JB™ bore cleaner is then followed by a several clean patches, a couple patches wet with cleaning solvent and finally clean patches to remove all traces of the abrasive substance from the bore. I have repeated the application of JB™ a number of times but once again, the final patches never came out perfectly clean.

A Bore Cleaner That Worked For A Change

To give the Bore Tech chemicals the ultimate test, the varmint rifles used in my yearly pilgrimage to Montana after the elusive prairie dog were selected. These rifles had up to 200 rounds fired through them and had been left dirty for several months.

Substituting Bore Tech's Bore Solvent™ I used the cleaning routine described earlier. At the end of three cleaning cycles, lo and behold, for the first time ever, the patches came out either completely clean or with only very slight smudges on them. I was amazed! Bore Solvent™ was the first gun cleaning solvent I ever used that actually worked.

A call placed to Bore Tech's Chemist, Ted Schlosser led me into the world of gun cleaning chemistry. Ted explained that most bore cleaners were solvents comprised of petroleum distillates and that these solvents were not nearly strong enough to dissolve fouling, often requiring repeated patching and brushing. This had a tendency to turn the cleaning process into a situation where mechanical abrasion was the key cleaning factor rather than chemical one.

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Schlosser explained that Bore Solvent™ is a complex mixture of synthetic solvents and that its deep cleaning activity came from the three surfactants it contains. These surfactants reduce surface tension by a chemical electrical charge, surrounding the powder residue and carbon which is then attracted to the patch.

Rather than relying on the drudgery of mechanical abrasion alone as other solvents do, Bore Solvent™ combines chemical action with brushing to lift off layered bore fouling. Bore Solvent™ does not need to sit in the bore to increase its efficiency, as its cleaning properties are primarily chemical.

Bore Solvent™ does have some copper removal properties but in my opinion combining Bore Tech's Copper Solvent™ as an additional step in the cleaning process is far more effective. A thin layer of Bore Solvent™ left in the bore upon completion of the cleaning process will protect the riay results with Bore Tech's Bore Solvent™. At the end of our outing George was invited to my home to conduct a cleaning comparison using his firearm. George cleaned the Ruger rifle he had been shooting with the product he normally uses utilizing the method described earlier.

Upon passing the final patch through his rifle and declaring it clean, George wet and then scrubbed the bore of his rifle using Bore Solvent™ with a bronze brush. The first clean patch came out pitch black looking as if the rifle had never been cleaned.

The first question from George's lips was, "Where can I buy some of this magical potion."

Bronze Bore Brushes and Patches

The choice of bronze bore brushes and patches is important. The brushes should be double wound on a brass stem ending in a loop (to protect the chamber and rifling) and should be of what I consider "bench rest" quality — meaning slightly oversize or tight fitting. As an aside, Bore Tech recommends on their product labels the use of "oversize" bronze bore brushes.

When a brush can be pushed down the bore too easily it needs replacing, as it is probably not reaching the bottom of the groves nor for that matter scrubbing the tops of the lands effectively. Scrimping by not replacing worn out bore brushes is truly a false economy because it increases dramatically the time and effort required to complete the cleaning process.

Not to be overlooked is the fact that the bristles of a brush used to scrub a bore will contain debris from the rifling and needs to be cleaned, too. The method I use is to hold the rod upright with the brush pointing toward the ground and squirt lighter fluid on the rod allowing the fluid to trickle downward. This cleans both the rod and the brush at the same time. The lighter fluid evaporates almost instantly and will not contaminate the bore solvent used in the next cleaning cycle.

Another product that can be used to clean dirty rods and brushes is Bore Tech's Blast™. Blast™ is an extremely effective degreaser and fast acting solvent packaged in an aerosol can. Two blasts of Blast™ (forgive the pun) and the "gunk" and unburned powder particles lining the threads of a removable shotgun choke were gone. Keep in mind that Blast's™ deep cleaning action removes all oil not only on the surface but also from the pores of the steel surface to which it is applied, so it is vital to re-oil Blast™ cleaned metal to prevent the formation of rust.

When questioned as to what other advantages Blast™ had over other aerosol cleaning compounds, Ted Schlosser, related that all other brands used halogenated hydrocarbons as their propellant whereas Blast™ did not, and therefore was environmentally safe.

Never, ever use stainless steel brushes in an effort to reduce bore brush cost. It is unwise to use brushes manufactured from the same metal as the barrel as in all likelihood they could scratch the bore, something to be avoided at all costs.

Care should be exercised in the choice of patches also. Once again I opt for slightly oversize "bench rest" quality patches made from pure flannel cotton. If the patch is loose and doesn't fit snugly, how will it compress enough to reach the bottom of the groves?

Incidentally, patches are only used once. They are pushed through the bore in one direction and then discarded. The rationale for single use is to remove and not reintroduce already loosened fouling matter back into the rifling. Personally, I have two exceptions to the foregoing statement. The first one is the application of a copper removal solvent using a slotted jag and the other the being the application of JB™ bore cleaner where the rifling is to be scrubbed.

In my opinion synthetic patches should be avoided because of their composition. They tend to slide down

Continued on next page

"When shooting up or down hill you must hold low"
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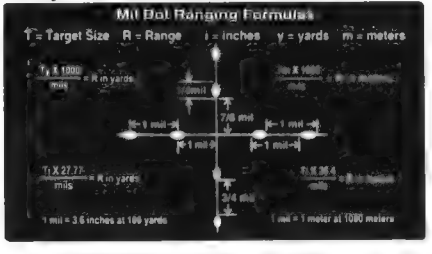
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What's Clean?

Continued

the bore too easily and not pick up residue as effectively as cotton.

The bronze brushes and patches I use are available from Robert Hart & Son who also stocks Bore Tech products. I buy brushes by the dozen and patches by the 1000.

Copper Remover™ and A Combination Cleaner

A bullet passing down the bore at high speed and under immense pressure normally coats the rifling with a thin layer of copper jacketing material. The amount of copper deposited is dependent on how smooth the surface of the rifling is and how many shots are fired. Removal of the precipitated copper coating is the second requirement to end up with a clean rifle barrel.

A simple method that allows for visual observation of the presence of copper in a bore is to slightly unwind the end of a Q-Tip and insert it about an inch or so down the muzzle. Next, shine a flashlight down the muzzle and light will be reflected back onto the rifling enabling one to easily see if copper is present.

The most commonly used copper remover is Sweets 7.62™, the principal ingredient of which is commercial strength ammonia. A bore is swabbed with Sweets™ and allowed to sit. The ammonia chemically dissolves the gilding metal turning it into copper salts, namely complex cupric ammonia hydroxide that will be displayed as the blue-green color on clean patches exiting the muzzle.

These steps are repeated until no trace of color is observed on the patches. Unfortunately, there have been occurrences of Sweets™ attacking and crazing rifling if left in a barrel for any extended length of time. The Sweets 7.62™ label even states that Sweets™ should not be left in a barrel for more than 15 minutes.

Since Bore Tech's Copper Remover™ is also ammonia based, what advantage would there be in switching to their product? The difference is buffers are blended into the formula of Copper Remover™ which maintain the pH and prevent it from becoming corrosive and attacking the barrel metal.

Bore Tech's President Bob Rambo is so confident in the safety of Bore Tech's Copper Remover™ that he stated it could be left in a firearm for over a year. And Bob made this pledge, "That if Bore Tech's Copper Remover™ ever caused damage to a barrel his company would buy the user a new replacement firearm." The application instructions call for allowing Copper Remover™ to sit in the bore from 10-15 minutes and then use a bronze brush to scour the bore. Obviously since Copper Remover™ is an ammonia based product the brush bristles will also be attacked and the life of the brush shortened, but this small expense is well worth incurring if a copper-free barrel is the goal.

Another product that combines a powder/carbon solvent with a copper remover is Bore Tech's Benchrest Blend™. This product was developed to fill the need for an efficient cleaning product that could be used when time is limited. To speed up the cleaning process, a useful feature when cleaning rifles between relays at a bench rest match, a different solvent and surfactant system is employed. Although Benchrest Blend™ is an excellent and effective product, in my opinion, its ability to remove copper and carbon is not as great as the two step process employing Bore Solvent™ and Copper Remover™. Nevertheless, where cleaning time is the primary consideration, Benchrest Blend™ is an excellent choice.

Moly Magic™

There has been some discussion amongst the bench rest crowd that the continued use of molybdenum disulfide coated bullets will after a time cause group sizes to increase. This loss of accuracy represents a serious problem, undoubtedly outweighing the major advantage of moly-coated ammunition — greatly reduced carbon and gilding metal fouling and hence a reduction in clean up time.

A bullet lubricated with molybdenum disulfide is subjected to extremely high temperatures and pressures as it streaks down a rifle barrel. Over time and under pressure the moly in the barrel degrades into its elemental state of molybdenum and sulfides.

Moly buildup is due to the fact that besides its attraction to metal surfaces it also begins to stick tightly to itself in overlapping layers similar to fish scales or blood platelets found in the blood stream. Add the presence of moisture and rust can form in the voids surrounding moly platelets.

Traditional bore cleaning solvents do nothing to remove moly from a barrel. What is needed and what Moly Magic™ contains is a solvent system containing — once again — special surfactants that surround the moly-to-metal bond as well as the moly-to-moly bond making

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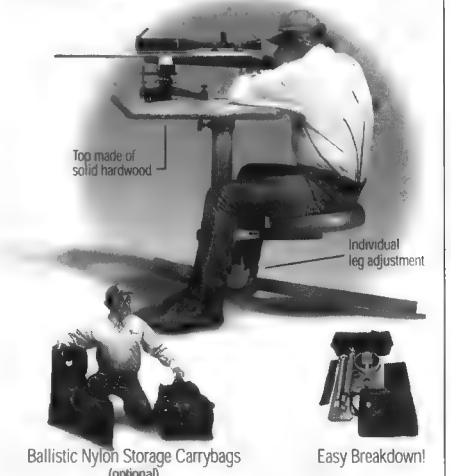

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mechanical removal possible.

How does one tell if this clear liquid product really works? First clean the firearm in the normal manner, removing all powder and copper fouling. Then apply Moly Magic™ by pushing 3-4 saturated patches through the bore. Wait 10-15 minutes and brush with a bronze bore brush. Finally, run a clean patch down the bore and examine the color of the patch — it will be coal black.

To the best of my knowledge, Bore Tech's Moly Magic™ is the only molybdenum disulfide remover currently available.

Another Handy Item

Another really innovative creation from Bore Tech is their plastic shotgun jags, which are available in all standard gauges. The nylon jag has a plastic spear point that catches and holds the patch in place. The body of the jag is slightly larger than the diameter of the shotgun barrel but has slotted sections that compress forcing the patch tight against the sides of the bore.

As can be surmised from the thorough testing of their products and from conversations with company management, Bore Tech's engineering staff has studied competitive products currently available in the marketplace with only one goal in mind — how can they make it better. Bore Tech has, in my estimation, reached that objective in their cleaning chemicals and accessories. So until something new and more efficient comes to the fore, products wearing the Bore Tech label will be used by me to clean my firearms.

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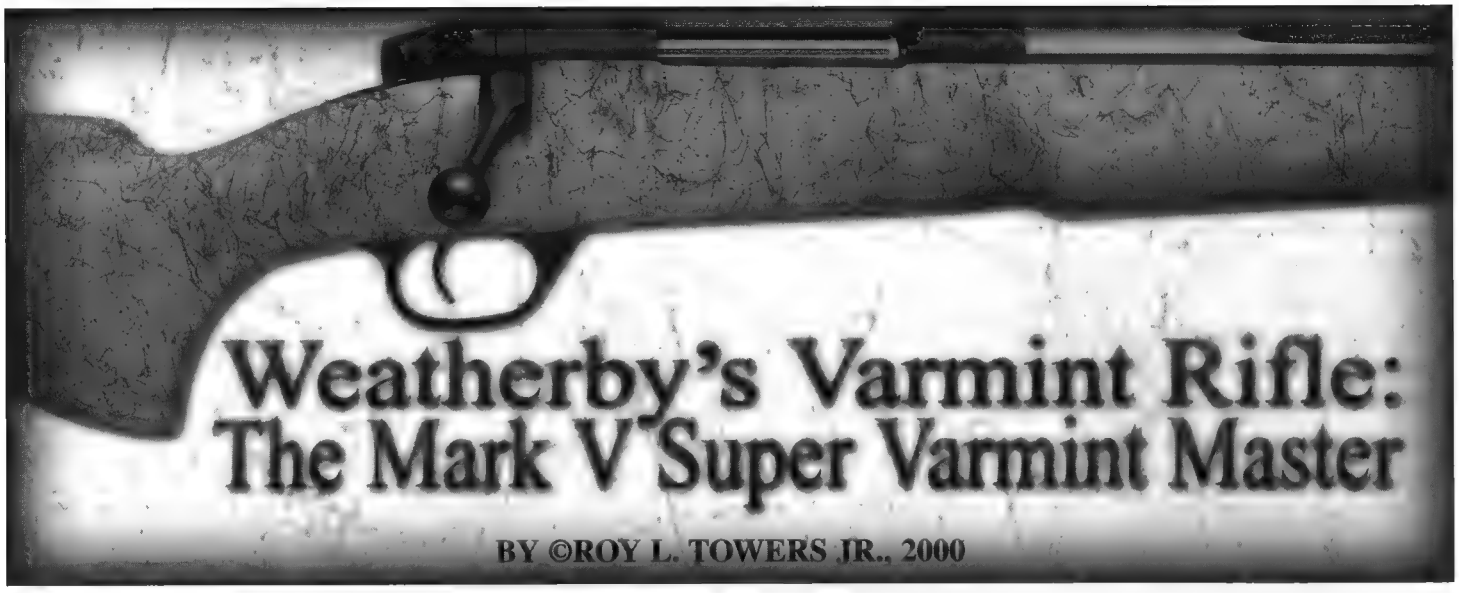

Weatherby's Varmint Rifle: The Mark V Super Varmint Master

BY ©ROY L. TOWERS JR., 2000

During my formative years, the 1960s, Roy Weatherby was the king of American rifle makers. His fine rifles and high-velocity cartridges were viewed by many as the apex of firearms art and technology. My father purchased many of the popular gun magazines of the day, and they featured stories and advertisements about Roy Weatherby's rifles and cartridges. The authors attributed almost mystical powers to them; they were said to produce fantastic, long-range, dramatic kills on big game. These narratives were punctuated with photos of the rich and famous hunting in exotic places, with Weatherbys at their sides. I have a 1963 Weatherby catalog, which my father had saved all these years. It is filled with pictures of Weatherby's customers and their hunting trophies: famous big game hunters such as Elgin Gates and Herb Klein; royalty such as the Shah of Iran and King of Nepal; gun writers such as Warren Page and (I bow my head) Jack O'Connor; and movie stars such as Robert Taylor and (gulp) JOHN WAYNE! Roy Weatherby presented his rifles as the requisite tools of the hunting elite and, in effect, created a very prestigious club. But Roy's club was not a closed one — all one had to do to become a member was to own a Weatherby rifle! It was a brilliant marketing strategy.

One day in 1963, my father purchased a Weatherby Mark XXII semi-auto .22 rifle. It was the most beautiful rifle I had ever seen. The stock had that distinctive Weatherby look, which some folks have described as "California style:" racy lines, extra fancy walnut, skip-line checkering, and gloss finish. The metal was highly-polished and deeply blued. With the purchase of the Mark XXII my father had joined the Weatherby club, and that Christmas his membership was confirmed — he received a Christmas card from Roy Weatherby!

I dreamed of a Weatherby Mark XXII of my own, but believed it an impossible dream. However, my wish came true when, for Christmas 1964, my father somehow scraped together enough money to buy me one. I remember the joy I felt when I peeled back the Christmas wrap and saw the "Weatherby" script on the box. My dad had wanted me to have a fine rifle that I could use with pride for my entire life. I learned how to shoot with that Mark XXII. I practiced with it at the range that my dad built on our friends' ranch. We'd put pieces of broken clay targets on the top of a rail and try to hit them. When we did manage to break them, we would put the resulting pieces back on the rail and shoot at them. Thus, as the day wore on, our targets became smaller and smaller, until they were no bigger than a pencil eraser. It was great fun. The shooting skills I possess today can be traced back to those days at the range with my Mark XXII. I cherish that rifle, and it occupies an honored spot in my gun safe to this day.

Many years have passed since that happy Christmas when I received my Mark XXII. Throughout the years, it remained the only Weatherby I had the pleasure of shooting. Then, last year, Weatherby announced a new varmint rifle, the Mark V Super VarmintMaster. Weatherby advertisements indicated this rifle was built from the ground up for accuracy, and photos of the rifle revealed a very nice looking gun. I called Mike Schwiebert at Weatherby, and he agreed to loan me a VarmintMaster for testing. He told me the rifle

was available in .223 Remington, .22-250 Remington, 220 Swift, .243 Winchester, 7mm-08 Remington, and .308 Winchester. I chose a rifle in .22-250, my favorite varmint cartridge.

The VarmintMaster arrived in a box imprinted with the same distinctive "Weatherby" script as the one that had contained my Mark XXII, and as I opened it I felt the same excitement I had that Christmas so many years ago. I pulled the rifle from the box, carried it to my shop, and took it apart.

The Super VarmintMaster has a beautiful little action, which can be described as a scaled-down version of the Weatherby Mark V. The action is about 8 1/2" long, with a loading port 3 1/8" in length. The VarmintMaster I received is the single-shot version (the rifle is also available as a repeater). The bolt is fluted, with three gas ports to direct gasses away from the shooter in the event of case or primer failure. The bolt's lock-up mechanism is pure Weatherby; it consists of three sets of three locking lugs. Besides being strong, this kind of lock-up allows for a bolt lift of only 45°. I examined the lugs and determined, by the presence of rub marks, that all lugs contacted their counterparts in the action, albeit to a depth of only about .025" from their juncture with the bolt body. The bolt has a Sako-type extractor, and a plunger ejector that imparts just enough pressure to throw the spent case clear of the action. The rear of the bolt has a two-position safety and a massive bolt shroud.

All in all, the action is a fine piece of design and workmanship.

The VarmintMaster's barrel is unique for a Weatherby rifle, as they do not manufacture it. The barrel is manufactured by Criterion™, which is a division of Krieger Barrels, Inc. Krieger has an excellent reputation for producing fine barrels, and Weatherby's use of these barrels for the VarmintMaster attests to their commitment to accuracy. The barrel is button rifled, hand lapped, and cryogenically treated to -300°. It has a heavy contour (.823" muzzle diameter), is 26" long, and is fluted.

The trigger breaks crisply and is adjustable for weight of pull and sear engagement. When I tested it with my trigger scale, it broke at 3 1/2 lbs. Although I tried, I was unable to adjust this trigger to a lighter pull. It is one of the most

Continued on next page

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Weatherby's Varmint Rifle: The Mark V Super VarmintMaster *Continued*

consistent triggers I have tested — it broke right at 3 1/2 lbs. again and again.

The stock is made of kevlar and fiberglass, and is tan with black spider webbing. It has that distinctive Weatherby Monte Carlo style. The stock has a CNC-machined aluminum bedding block, and a wide, beaver tail fore-end to help stabilize the rifle when shooting over a front rest. The stock contacts the barrel in two places: at about 2 1/2" from the end of the fore-end, and for about 1 1/2" in front of the action.

To my taste, the Weatherby VarmintMaster is one beautiful rifle. It is a no-nonsense varmint rig that just looks accurate. (Know what I mean? Some rifles just scream accuracy!). I mounted a Leupold 36 power scope in the Tally rings provided with the rifle, and headed for the range.

All of my life I have been blessed with a great place to shoot and hunt. Close family friends own a ranch about 20 minutes from where I live. I have run around those hills since I was four-years old, and I know them like the back of my hand. Last year was my 41st deer season at the ranch. Every place on the ranch holds a fond memory. One could say I grew up on the ranch. It is where I learned how to skin deer, catch lizards, stand up straight, and do things right the first time. The shooting range my father built in the early '60s is located along a creek at the bottom of draw. Tall hills border it on three sides, which protect the shooting lane from the wind. The range shack contains a solid shooting bench and reloading table. A wide target frame sits 100 yards up the canyon, where I can put up 16 targets at one time and shoot till my heart's content. I've spent many happy hours there at my shooting range. It is where I go to sort things out.

For this test I did something differently from past tests: I used factory ammo as well as my own loads. I haven't shot factory ammo for over 20 years, but I was interested in testing the new "premium" ammunition now marketed by several manufacturers. I called Hornady, Winchester, and Federal, and they kindly provided me with premium ammo for this test.

My test of the VarmintMaster took place over two days. The temperature on both days was 75°. The groups reported below are averages of two five-shot groups. The .22-250 cases used for my loads were made from Remington .308 BR brass, which features a small rifle primer pocket. I believe there are accuracy and barrel life advantages to using small primers (see "Building and Shooting a .22-250 Ackley Improved," Precision Shooting, February 1997). My previous tests have proven that Remington 7 1/2 small rifle primers, which are hot relative to other small primers, will ignite the powder column of the .22-250 reliably. **The powder charges listed below would react differently, possibly dangerously, with large primers. In any case, do not consider these loads as safe for your rifle. These loads were safe in the tested VarmintMaster on the day I shot them. Neither the author nor this publication represent that these loads are safe for your rifle.**

As one would expect, the rifle liked certain ammunition better than others. The factory ammo with the best accuracy was the 40 gr. Hornady V-Max Molly, with groups averaging .674 MOA. The 50 gr. Winchester and 40 gr. Federal also shot reasonably well. It appears to me from my limited test that factory ammo has improved over the last 20 years. The reloads were more accurate than the factory ammo because I was able to tune the loads to the rifle. Reloads shot groups from the mid-sixes to the mid-fives. I consider this very good accuracy from a factory rifle.

Someone once said that critics are like eunuchs: they know what to do but they can't do it. So, at the risk of being identified as a man who, how shall I say, speaks in falsetto, I'd like to offer my two cents for making the VarmintMaster more accurate.

The nine bolt lugs make contact with their counterparts in the action, but for only about .025" from their junction with the bolt — not much bearing surface for each lug. Common sense tells me that, because of the small bearing surface, the lugs may flex under the pressure of a fired round, which would adversely affect accuracy. But common sense also tells me that the world is flat,

Commercial Ammunition

Manufacturer	Bullet	Velocity	Group (MOA)
Hornady Varmint Express	40 Hornady V-MAX Molly	4100	.674
Winchester Supreme	40 Ballistic Silvertip	4085	1.097
Federal Premium	40 Sierra Varminter HP	3944	.865
Hornady Varmint Express	50 Hornady V-MAX Molly	3767	1.151
Winchester Supreme	50 Ballistic Silvertip	3841	.765

My Loads

Bullet	Powder	Load	Case[2]	Velocity	Group (MOA)
40 Berger MEF Molly	IMR 4064	37.5 gr.	Rem. BR	4050 fps	.548
52 Berger Molly	Varget	37.5 gr.	Rem. BR	3820 fps	.661
5 Berger MEF Molly	IMR 4064	35 gr.	Rem. BR	3605 fps	.627

so I may be wrong.

The trigger breaks consistently and crisply, but will not adjust to under 3 1/2 lbs. This is too heavy for most of the varmint and target shooters I know. These folks like their triggers light. I do too. A trigger that would adjust to 2 lbs or less would be a welcome improvement to this rifle.

The rifle has an excellent stock. It fit me like a glove, and shot very well on the bags. The stock has an aluminum bedding block, which, Weatherby states, is precision machined to provide a ridged and stable platform for the action. Weatherby also has stated that they take great care to torque the action bolts to 65 inch pounds. However, careful torquing does not assure that the action is properly mated to the stock. One can't properly bed an action with a torque wrench. Even slight variations in manufacturing tolerances will result in a relatively poor stock-to-action fit. I am partial to stocks with aluminum bedding blocks, but I favor them because they provide a good base for bedding compound, not because they offer good contact by themselves. I have worked with a fair amount of stocks with aluminum blocks, and accuracy always improves to a measurable degree when I bed them with Devcon. In addition, the VarmintMaster I tested was a single-shot with a solid receiver, but the stock had a void through the bedding block where a magazine would be. Apparently, Weatherby uses the same stock for the single shot as it does for the repeater, probably to save manufacturing costs. However, this void negates one of the advantages of a single shot action: increased bedding area.

(Boy, I am long-winded! What I've tried to say is that the stock would be better if it had a full-length block that is bedded with bedding compound.)

The Weatherby Super VarmintMaster is a nice rifle, and I wish I could have kept it. Alas, I guess I'll have to be content with just one Weatherby — my old friend, the Mark XXII semi-auto. My father no longer owns his Mark XXII; last year he gave it to my daughter, Anna, for her birthday. My dad wanted her to have a fine rifle that she could use with pride for her entire life. I think tomorrow I will take her to the range at the ranch. We'll shoot pieces of clay targets, until they get smaller and smaller... After all, Anna is now a member of the Weatherby club, joining the ranks of royalty, great gun writers, John Wayne, and me.

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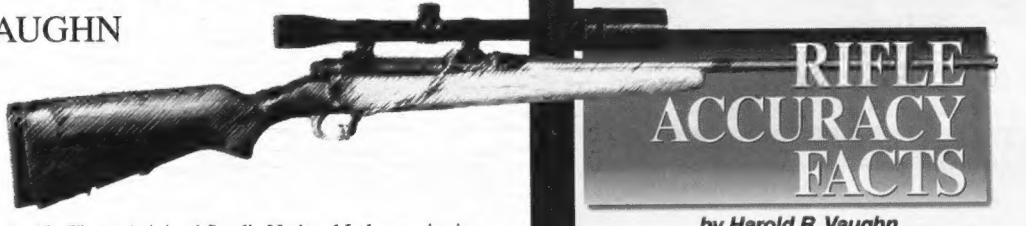
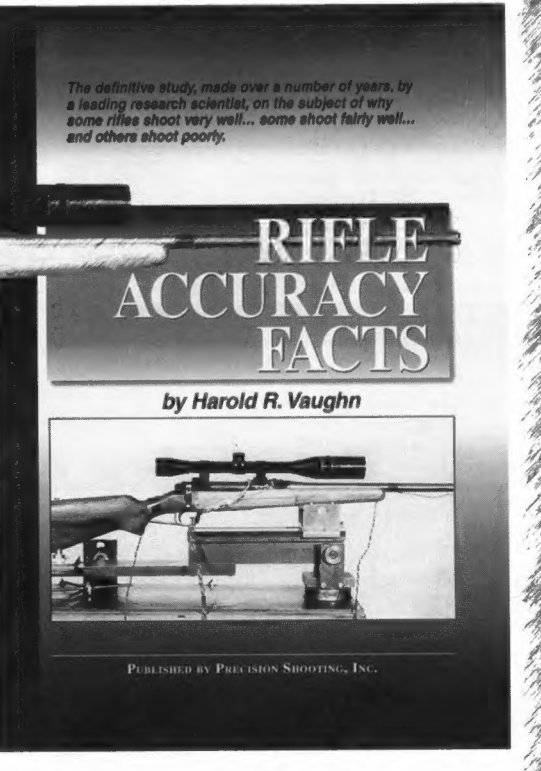
BY HAROLD R. VAUGHN

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About the Author...

Harold, Vaughn, following World War II (where he flew 100 combat missions in P-47's and P-51's in the Pacific Theater), joined Sandia National Laboratories in New Mexico...where, after a distinguished career, he is today recognized as the "grandfather" of the Aeroballistics/flight mechanics technology base for nuclear ordinance.

About the book...

While heading the Aeroballistics Division at SNL, in his spare time hours Harold Vaughn found himself increasingly fascinated with the question of why some rifles shoot well, and other do not. Casual curiosity gave way to a 100-yard underground tunnel range, a Six Degree of Freedom Computer, a rail gun, and shadowgraphs of bullets in flight... and ten years of exhaustive research and record-keeping. The ultimate in scientific experimentation is skillfully blended with a dyed-in-the-wool gun crank's fascination with, and curiosity for, his favorite subject... Accuracy. A partial list of the book's chapters would include... Internal ballistics... Chamber and throat design... Barrel vibration... Scope sight problems... Barrel-receiver motion... Muzzle blast... Bullet core problems... Bullet imbalance... External ballistics... and many more.

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A

Accurate Rifle Subscription 61

B

Baer's Gun Shop 21

Ballisticard Systems 5

Bart's Custom Bullets 35

Black Hills Ammunition 42

D

D & B Supply 69

H

Hart Rifle Barrels 60

J

Jewell Triggers, Inc. 79

K

Kokopelli Products 58

L

Lilja Precision Rifle Barrels, Inc. 57

M

Mounting Solutions Plus 5

N

Nesika Bay 14

Nosler, Inc. 41

P

Precision Arms 77

Precision Shooting Book Offerings 37

Precision Shooting Calendar 19

Precision Shooting Publications .. 29, 42, 44, 67, 81, 83, 84

Premier Reticles, LTD 68

S

Shilen, Inc. 25

Shooters.com, Inc.-Badgeboys.com 80

Shooting Chrony 63

Sierra Bullets 62

Sinclair International 41

Slope Doper 75

Spencer Custom Guns 65

Springfield, Inc. 2

T

Tactical Shooter Back Issue Sale 79

Talbot QD Mounts 74

Tru-Kote 28

V

Varmint Masters, LLC 76

W

Western Powders 43

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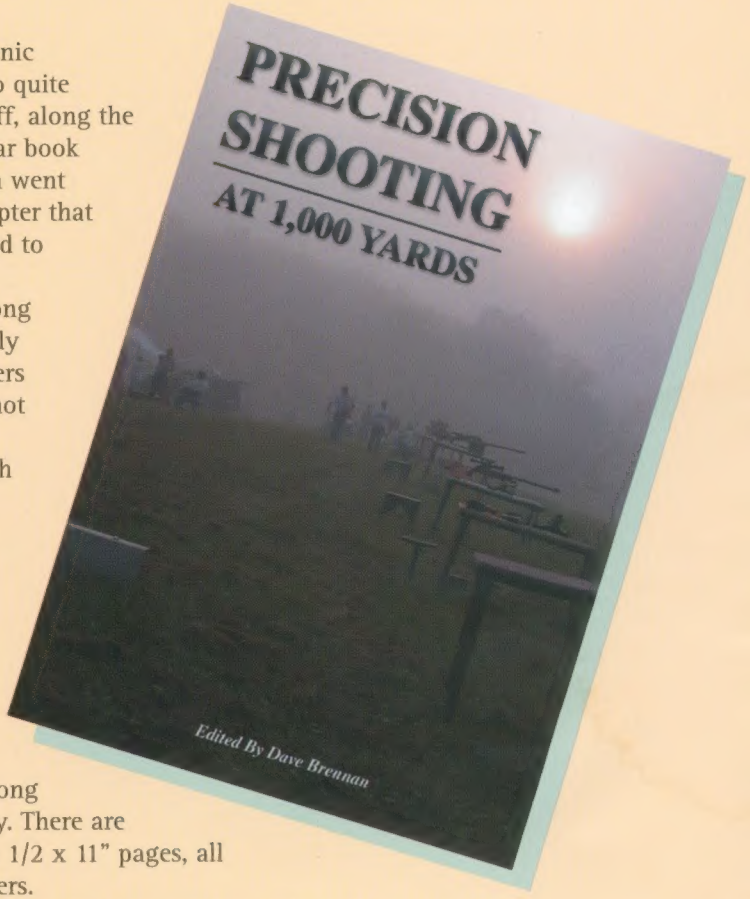

About 6-7 months ago, when this book was in its embryonic stage, one of our writers, who had just been subjected to quite a bit of arm-twisting, remarked that "If you carry this off, along the lines that you are talking about, it may well be the most popular book that you ever published". We agreed with his opinion...and then went back to beating up the fellow for his promise to author the chapter that we wanted from him. Flattery, while nice, should not be allowed to serve as a distraction from one's primary objective.

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Our first published book for the year 2000 Holiday Season...

THE COMPLETE GUIDE TO AR-15 ACCURACY

By Derrick Martin & Barrett Tillman

Yes you're perfectly correct... there are two AR-15 accuracy books already in wide distribution. Yes, you're right again... both books are quite good. Yes, now that you mention it, we published one of the two ourselves... you're still correct.

So, why did we publish another AR-15 accuracy book? We asked Derrick Martin that very question, at a time when he had us pinned to the ground, and was sitting on our chest, and telling us that we had just been selected to publish his new book, and it was going to make both of us famous, as well as rich. Since neither of these conditions are terribly high on our list of priorities, we felt that our inquiry (and thus, by association... if nothing else... *your* inquiry, good reader) was germane to the discussion. Derrick made a darn good point in his response (we didn't tell him this; the fellow does not suffer from a lack of self-confidence as it is, and why make things worse?)... namely that both existing books had been written by (successful) shooters, and from a shooter's perspective. His book was being written from the perspective of an accuracy gunsmith. To give you a bit of the background...

Derrick Martin became an active NRA Highpower rifle competitor with the Arizona National Guard Rifle Team and the All National Guard Rifle Team. He became a Distinguished Rifleman in 1987, joined the Palma 20 in 1988, a President's 100 shooter in 1988, a NRA High Master in 1992, a National Guard Chief's Fifty Shooter in 1995, and became a Distinguished Pistol Shot in 1996.

He has been a continuous member of the All National Guard Rifle Team since 1988, and has been on winning teams at the National Guard Wilson Matches, All Army, inter service at Camp Perry, as well as the Australian and British Skill At Arms Matches. In 1993 he developed the National Guard's M-16 Match Rifle Program, and has been a leading national proponent of the M-16, both as a service rifle and a NRA match rifle. Accuracy Speaks was founded in 1989, and had been a mainstay in the shooting sports, both regionally and nationally since then. The Company has built and modified firearms for national and world champions.

Barrett Tillman is known to dozens of readers as amanuensis (a word he learned from the Editor) to Derrick Martin. Their articles in *Precision Shooting* and *Tactical Shooter* magazines have gained them an international reputation for profound commentary on all manner of mechanical and ballistic topics of interest to people who have never played golf, a pastime that lacks the essential components of a satisfactory sport (i.e., loud noise, supersonic objects, and recoil). Tillman makes a poor-but-honest living as a self-employed writer and editor who divides his time between Arizona and his native Oregon. He was a co-founder of Oregon IPSC, shoots in occasional service rifle matches, and has gone Cowboy in a big way (He led the National Championship Posse in 1997). In addition to hundreds of articles, he has written four novels and more than twenty nonfiction books on naval and aviation topics.

The new Martin-Tillman book has over 200 pages, over 250 photographs, and (Dare we say it?) a number of *cartoons*! (The latter alone should just about guarantee best seller rankings)

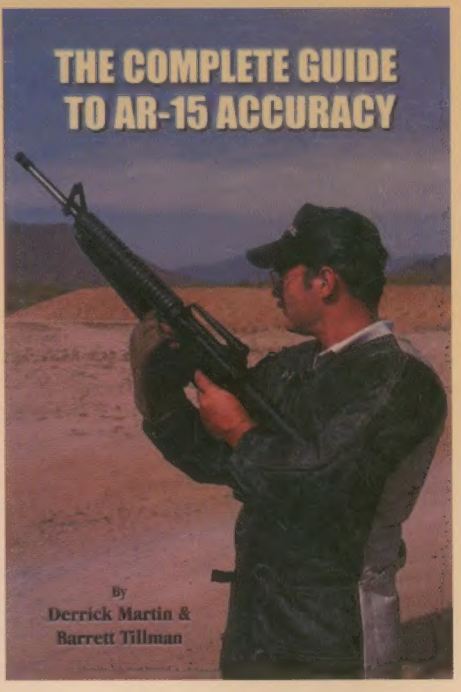

TABLE OF CONTENTS:

Chapter One:	The New Shooter
Chapter Two:	Converting To the AR-15
Chapter Three:	The Long Range M16 Service Rifle
Chapter Four:	Goal Setting and Training Philosophy
Chapter Five:	IPSC Three-Gun Event
Chapter Six:	General Shooting Tips
Chapter Seven:	Cleaning and Maintenance
Chapter Eight:	Barreling
Chapter Nine:	Floater Tubes
Chapter Ten:	Sights and Scopes
Chapter Eleven:	Triggers
Chapter Twelve:	Loads for AR-15s
Chapter Thirteen:	AR-15 .22 Long Rifle
Chapter Fourteen:	AR-10 and SR-25
Chapter Fifteen:	Troubleshooting
Chapter Sixteen:	Trick Gunsmithing Stuff
Chapter Seventeen:	Glen Zediker, Guest Author

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